

Therapeutic Lifestyle Change: Piloting a Novel Group-Based Intervention for
Depression

By

Leslie Karwoski

M.A., University of Kansas, 2003

Submitted to the graduate degree program in Psychology and the
Faculty of the Graduate School of the University of Kansas
In partial fulfillment of the requirements for the degree of
Doctor of Philosophy

Stephen S. Ilardi, Chairperson

Committee members

Bruce Frey, Ph. D.

Raymond L. Higgins, Ph.D.

Rick E. Ingram, Ph.D.

Jonathan Templin, Ph.D.

Date Defended: May 1, 2006

The Dissertation Committee for Leslie Karwoski certifies that this is the approved version of the following dissertation:

Therapeutic Lifestyle Change: Efficacy of a Novel Group-Based Intervention for Depression

Chairperson

Date approved: May 1, 2006

Abstract

A novel treatment protocol for depression has been developed based on an evolutionarily informed conceptual framework (Ilardi, Karwoski, & Lehman, 2006) that regards the recent epidemic of depression in developed nations as arising in part from the loss of antidepressant elements present in the ancestral human environment—a set of features ranging from regular aerobic activity to ample dietary fatty acids to robust social support networks. Accordingly, this 12-session group protocol, *Therapeutic Lifestyle Change (TLC)*, emphasizes a set of six distinct, modifiable lifestyle elements, each of which has been shown independently to have antidepressant efficacy or prophylactic value. In the present investigation, TLC was administered to a group of 30 depressed individuals in order to establish the treatment's feasibility, and to compare symptom reduction among the participants with that of a control group (n=12) randomly assigned to receive treatment as usual in the community. Among treatment completers, 86% of patients receiving TLC achieved treatment response, as defined by a 50% or greater reduction in BDI scores, compared with 33% of the patients in the waitlist control group. Although preliminary, these data suggest that TLC may be an efficacious intervention for major depressive disorder.

Therapeutic Lifestyle Change: Piloting a Novel Group-Based Intervention for Depression

Depression is a serious and debilitating illness. It is the fourth most costly of all health problems in the world (Keller & Boland, 1998) and is the leading medical cause of lost work productivity in the United States (NIMH, 1999). At any given point in time, about 3-5% of the population meet diagnostic criteria for the disorder (Kessler, Berglund, Demler, Jin, & Walters, 2005), with the point prevalence rate approximately twice as high among women (7.0%) as among men (2.6%; Kessler et al 2005). There is also evidence that the incidence of depression has been increasing steadily over the past several generations (Seligman, 1988). According to the Epidemiological Catchment Area study-- which included interviews with nearly 10,000 randomly selected adults in three U. S. cities-- nearly one in four Americans will now be diagnosed with major depressive illness by the age of 75 (Kessler et al., 2005).

It appears that the rate of depression is increasing in both developing countries (Desjarlais, Eisenberg, Kleinman, & Good, 1995) and in urban industrialized societies (Klerman et al., 1985). In the U. S., there has been an apparent 10-fold increase in depression prevalence since World War II (Seligman, 1990). Successive cohorts defined by calendar year of birth consistently report an earlier age at onset of their first depressive episode (Klerman et al., 1985). Researchers believe this represents a genuine increase (Lavori et al., 1993), and not a mere reflection of methodological artifacts (e.g., temporal differences in participant recall of depressive symptoms or the willingness to report them). The finding of escalating depression prevalence has been remarkably consistent across studies, and has given rise to speculation about what factors might be responsible.

There is some evidence that the burgeoning depression epidemic may be due, at least in part, to a fundamental mismatch between the modern post-industrial milieu and the ancestral environment of evolutionary adaptedness (EEA; Bowlby, 1969), the hunter-gatherer context in which the human genus has spent over 99% of its existence. Not only has the prevalence of depression increased in the U.S. and the developed world as such societies have become more modernized (i.e., as they have progressively diverged from the ancestral hunter-gatherer lifestyle), but the risk of depression varies as a function of the level of modernization that has taken place, with the incidence of depression tending to be lower among developing countries with more traditional agrarian ways of life (Prince, 1967; Schumaker, 1996). Even within modern-day America, there is an example of a group of people living a lifestyle much closer to that of our distant ancestors. The Old Order Amish of Pennsylvania comprise a close-knit farming community that uses no electricity, no automobiles, and no alcohol or drugs. Researcher Janice Egeland studied their culture for 20 years, and reported that although lifetime rates of bipolar disorder were about the same as those of nearby Baltimore residents, rates of unipolar depression were about one-fifth to one-tenth as high (Egeland & Hostetter, 1983).

Hunter-gatherer societies—defined as those which subsist by means of foraging and hunting, without substantial domestication of either plants or animals—were the norm during the Paleolithic period, which lasted 2 million years and ended approximately 12,000 years ago. Such societies typically consist of a small band of people—a few dozen or so—living in close contact for decades (Brody, 2001). There are a few hunter-gatherer bands in remote parts of the world that still maintain a lifestyle similar to that of our Stone Age ancestors; they would thus not be expected to suffer the consequences of the mismatch between modern society and the lifestyle that we have been adapted for. One example is the Kaluli people, a

primitive band in New Guinea, observed by anthropologist Edward Schieffelin over a period of 20 years. He found only one person who displayed symptoms of depression among the few thousand Kaluli individuals he assessed (Schieffelin, 1985). Likewise, prominent symptoms of depression appear to be virtually absent among the Toraja people, a hunter-gatherer band in Indonesia (Hollan, 1992; Schumaker, 1996).

Evolutionary Perspectives

Adopting an evolutionary perspective on depression is not a new idea. In fact, numerous evolutionarily informed models of depression have been proposed in recent years (see Nesse, 2001 for review). Evolutionary psychologists have noted that depression occurs in the population at a rate roughly 100 times that which would be expected on the basis of spontaneous genetic mutation. Accordingly, it has been suggested that depression must confer some selective advantage or it would be rare (Longley, 2001). Certainly, depressive *mood* can often be adaptive. Theorists have proposed several ways in which dysphoria may actually increase fitness. For instance, a low rate of positive reward or low level of control over rewards and punishments instigates depressed mood. The resulting short-term inhibition of appetitive functions, like low levels of energy, pleasure, and motivation, could be adaptive by allowing the individual to conserve resources and eventually redirect them toward more productive endeavors (Nesse, 2001). People often experience dysphoria and related symptoms after defeat in antagonistic encounters among competitors; the resulting subordinate or yielding behavior could conceivably serve to minimize the risk of physical injury or death (Price, Sloman, Gardner, Gilbert, & Rhode, 1994).

Another theory regarding the adaptiveness of dysphoria proposes that it may help the individual realize that his or her current situation is not ideal for enhancing survival, thereby providing motivation for a change of course.

“Whereas physical pain functions to inform individuals that they have suffered a physical injury—motivating them to cease activities that would exacerbate this injury, as well as to avoid future situations which would also result in such an injury—psychological pain informs individuals that their current social strategy or circumstance is imposing a fitness cost, motivating them to cease activities that would exacerbate this cost, as well as to avoid such similar future situations that would also likely result in a fitness cost. Such circumstances include, e.g., the death of children and relatives, loss of status, loss of a mate.” (Hagen, 2003, p. 8).

In the face of a social failure, it may be adaptive to pause for re-evaluation rather than immediately pursuing another social opportunity without stopping to evaluate what went wrong during the preceding failure episode.

However, although it is plausible to regard short-term dysphoria as adaptive in this fashion, it is much more difficult to discern any adaptive benefit arising from the long-term debilitation and reduction in self-care observed in depression. People with MDD often reduce their food intake, sleep, and grooming habits to the point that their health starts to deteriorate. They may even attempt suicide. “It is hard to imagine a behavior that is less likely to maximize an individual’s contribution to his or her gene pool than suicide” (Feder, 2001, p. 1084).

Simply put, dysphoria and related behavioral phenomena may be adaptive in many circumstances in the short-term, but they are not likely to be so over the long-term. It is adaptive for people to be sad or to grieve for a short period of time, but then they should return to a more normal mood state. “The past usefulness of unpleasant feelings is the reason periodic unhappiness is a natural condition, found in every culture, impossible to escape.

What isn't natural is going crazy--for sadness to linger on into debilitating depression, for anxiety to grow chronic and paralyzing” (Wright, 1995, p. 53).

Dysphoria has the earmarks of an adaptation and it *appears* to be on a continuum with clinical depression, which is more severe in terms of intensity, frequency and duration. However, severe clinical depression is not appropriately described as an adaptation. As Nesse (1999) has observed “sadness is almost certainly adaptive, but depression may arise from dysregulated sadness, or from an entirely separate mechanism” (p. 356). It has been hypothesized instead that the mechanism giving rise to long-term major depression is the fundamental mismatch between the modern human environment and the ancestral environment to which the genome is adapted (Cosmides & Tooby, 1999).

Evolution acts on the relationship between the genes and the environment. Organisms vary in both their sensitivity to different environmental stimuli and the outcome of these interactions with elements in the environment (Tooby & Cosmides, 1990). Because the majority of selection effects on the human genome occurred in a hunter-gatherer context, it is conceivable that humans are designed to recover from brief episodes of sadness or grief on the basis of exposure to robust antidepressant effects of the ancestral environment (Ilardi, Karwoski, & Lehman, 2006). For example, exercise has been shown to have potent antidepressant effects (Blumenthal et al., 1999; Brosse, Sheets, Lett, & Blumenthal, 2002). But there has been no selection pressure for people to crave exercise, because in the ancestral environment people were continually forced to engage in vigorous physical activity; it was not something they needed to have an innate (i.e., genetically mediated) urge to do. Americans are no longer living in an environment that engenders vigorous physical activity, and thus they are missing out on an environmental feature related to lower levels of depressive symptoms. Although the residents of modern industrial societies are functioning

well in many respects, the human environment has changed far too rapidly in recent centuries for effective genetic adaptation (Tooby & Cosmides, 2002). Thus, there may exist a mismatch between the environment we were designed for and the one that we are living in, resulting in a sharp increase in prolonged bouts of depression.

Facets of Mismatch

The modern environment is different from the ancestral environment in a number of obvious ways. Diet, exercise and sleep habits, living arrangements, and daily activities have changed dramatically over the past several thousand years. The following section reviews several ways in which the modern environment is different from that of our Stone Age ancestors—specifically, ways in which characteristic features of the modern environment contribute to the onset and maintenance of major depression. Much of what we know about the ancestral lifestyle is based on the study of modern day hunter-gatherer societies because they share many commonalities with hunter-gatherers thousands of years ago (Spielmann & Eder, 1994). Additionally, lifestyle differences that have arisen more recently—over the past couple of hundred years—will be discussed. Many aspects of the Pleistocene environment, such as dietary fatty acid intake and the amount of time spent outside remained relatively constant features of the traditional agrarian way of life that emerged about 10,000 years ago, and have only changed dramatically with recent generations. Furthermore, the increase in rates of depression has been documented to have taken place largely over the past hundred years, which implies that changes in lifestyle that have occurred very recently have had an important impact. Finally, in this section, evidence for the antidepressant efficacy of lifestyle changes will be reviewed.

Exercise

A recent survey of American adults found that only 26% of them engage in regular physical activity at the level recommended by the American College of Sports Medicine (ACSM) for maintaining physical and mental health (Pate et al., 1995), and 59% do not participate in any leisure-time physical exercise at all (Centers for Disease Control and Prevention, 2003). On the other hand, examination of musculoskeletal remains reveals that Stone Age people, almost without exception, regularly engaged in vigorous physical activity (e.g., Molnar, 2005). Even Americans of a century ago, prior to the advent of automobiles and electrical appliances, were much more physically active than they are today (Brownson, Boehmer, & Luke, 2004).

There has long been epidemiological evidence linking the practice of regular exercise with reduced risk of depression onset (e.g., Stephens, 1988; Ross & Hayes, 1988). More recently, a number of controlled trials have evaluated the efficacy of exercise as a treatment for depression. Of the six studies that have compared exercise with a waitlist control or placebo in populations of individuals diagnosed with depression according to either DSM criteria or an established cut-off on a measure of symptom severity (Dooyne et al., 1987; Dunn, Trivedi, Kambert, Clark, & Chambliss, 2005; Martinsen, Medhus, & Sandvik, 1985; McNeil, LeBlanc, & Joyner, 1991; Mather, et al., 2002; McCann & Holmes, 1984; Singh, Clements, & Singh, 1997; Veale et al., 1992), all six found that participants in the exercise condition achieved significantly greater reductions in depressive symptoms. Five of these studies used aerobic exercise and two used anaerobic exercise (one included both and found no difference between the two).

Two published studies have compared exercise with some form of psychotherapy (Fremont & Craighead, 1987; Greist et al., 1979), and both found exercise to be equally effective in relieving symptoms of major depressive disorder. Klein and colleagues (1985)

found running to be equal to either group therapy (which combined elements of interpersonal and cognitive therapy) or a meditation-relaxation group. Probably the most compelling study to examine the efficacy of exercise is that of Blumenthal and colleagues (1999), which directly compared the effects of aerobic exercise, antidepressant medication, and a combination condition. Research participants were 156 older adults (≥ 50) who had been diagnosed with major depressive disorder (MDD) according to DSM-IV criteria. Those in the aerobic exercise condition walked or jogged—at an intensity sufficient to maintain heart rate in an aerobic range—three times a week for 30 minutes. Those in the medication condition received sertraline (an SSRI). Both groups received active treatment for 16 weeks. Scores on both the HRSD and BDI improved significantly and substantially for both the aerobic and anaerobic conditions, and patients in all three groups achieved comparable improvement.

Blumenthal and colleagues continued to follow participants from the aforementioned study for 6 months after treatment termination, and found that the exercise-only group (i.e., those who did not receive Zoloft) had significantly lower risk (8%) of relapse than those who received medication alone (38%) or a combination of the two (31%; Babyak, et al., 2000). Further, patients who continued to exercise on their own during the follow-up period had a significantly reduced probability of depression recurrence. The study authors had hypothesized that combining exercise with pharmacotherapy would produce the best results, and were surprised that combining the two conferred no additional advantage over either treatment alone. They speculated, based on clinical observation, that there were “anti-medication” sentiments on the part of some patients, and that other patients in the combined group may have attributed their improvement to the medication, missing out on the sense of personal mastery and positive self-regard typically achieved through exercise. The 6-month follow-up provided preliminary evidence of the long-term efficacy of exercise for depression.

Singh and colleagues (1997) have conducted the lengthiest follow-up of any exercise study to date: two years beyond the end of the intervention (Singh, Clements, & Singh, 2001). Among the participants, diagnosed with depression according to the DSM-IV criteria, the study's exercise (weight-lifting) group showed significantly greater reductions in BDI in comparison with an attention-control health education lectures group by treatment termination, and they remained significantly less depressed than controls at a 2-year follow-up. There was also a non-significant trend for those in the exercise group who remained active to have a better long-term response than either the exercisers who had stopped lifting weights or the study controls. Additionally, the study's lengthy follow-up period suggests that a substantial subset of individuals with depression who are introduced to exercise will stick with it (33%), and that exercise continues to confer prophylactic benefits after study completion.

A few studies have directly compared the effectiveness of aerobic and anaerobic exercise, and these found no significant difference in symptom reduction between the two conditions (Martinsen, Hoffart, & Solberg, 1989; Doyne et al., 1987). In addition, two meta-analyses have compared the effect sizes of aerobic and anaerobic exercise on depression across different studies (North et al., 1990; Lawlor & Hopker (2001). Neither found an association between type of exercise and the magnitude of treatment response. Although available evidence suggests that both exercise modalities are equally effective, the majority of RCTs, including the most methodologically sound trials (e.g., Blumenthal, 1999) have used aerobic rather than anaerobic exercise. Moreover, a recently published trial among elderly depressed medical patients suggested an advantage for aerobic over anaerobic exercise (Penninx et al., 2002). Thus, at present, aerobic exercise may be considered to have stronger research support than anaerobic exercise.

Regarding exercise “dosage”, one recent RCT was designed to answer the question of exactly how much exercise is necessary to achieve antidepressant benefit (Dunn et al., 2005). Outpatients (n=80) with mild to moderate major depressive disorder were assigned to one of five different conditions: four exercise groups which varied according to the total energy expenditure (either low dose—7.0 kcal/kg/week or the “public health dose”—17.5 kcal/kg/week—recommended by the ACSM; Pate et al., 1995) and the number of days per week (3 versus 5), and one placebo group which did stretching/flexibility exercise. Those in the active (higher-dose) exercise groups worked out on a treadmill or stationary bike under supervision in a laboratory for 12 weeks. By treatment termination, patients in the high dose condition had experienced a mean 47% reduction in HRSD scores, regardless of how many days a week they exercised. This was significantly larger than the symptomatic reductions observed in the low dose and placebo conditions (29% and 30% reductions respectively). This well-controlled study provides evidence that intensity of exercise does matter.

Exercise tends to take place in the presence of others, and thus some theorists have questioned whether there is an independent effect of exercise alone, and if so, what the mechanism of action might be. In the Dunn et al. (2005) study, patients exercised alone in rooms that were monitored by laboratory staff regardless of treatment group assignment. There was a significantly greater reduction in symptoms for the higher-dose aerobic exercise groups, implying some additional benefit for intense aerobic exercise beyond simply social contact. A number of biological pathways have been proposed to explain exercise’s antidepressant effects (see Brosse, Sheets, Lett, & Blumenthal, 2002 for review). For example, there is a growing body of evidence to suggest that exercise increases monoamine functioning in a way that might address the dysregulations created by depression (Dishman, 1997). A second explanation concerns the hypothalamic-pituitary-adrenal (HPA) axis, which

has often been observed to be hyperactive in patients with depression. Exercise has been observed to attenuate the HPA axis response to stress (Brosse, Sheets, Lett, & Blumenthal, 2002).

Nutrition

The modern American diet compares poorly in some respects with the ancestral human diet. Lipids, which are made up in part of highly unsaturated fatty acids, constitute 60% of the solid mass of the brain and are required for normal brain structure and function. Dietary fatty acids are of two common types: n-3 (omega-3) and n-6 (omega-6). Omega-3 fatty acids include docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) (Yehuda, Rabinovitz, & Mostofsky, 1999). The diets of paleolithic humans contained substantial amounts of Omega-3 fatty acids, derived mostly from the fat of wild animals. Similar amounts of fatty acids are currently present only in the diets of Eskimos and Japanese fisherman; most Americans now consume meat in the form of farm-raised animals or fish, which has little omega-3 content (Leaf & Weber, 1987). Thus, during the last century, dietary intake of EPA and DHA has dropped significantly (Eaton & Konner, 1985). This change is thought to contribute to the widespread increase in chronic inflammatory conditions (e.g., inflammatory bowel disease, rheumatoid arthritis) in the 20th century (Horrobin, 2001).

The ratio of n-3 and n-6 fatty acids appears to be abnormal in individuals with depression. Compared with healthy control participants, depressed patients have low plasma levels of n-3 fatty acids, especially relative to the plasma concentrations of n-6 observed among healthy control subjects. This imbalance has been noticed in studies in Australia, Japan, Europe, and North America (e.g., Adams, Lawson, Sanigorski & Sinclair, 1996; Edwards, Peet, Shay & Horrobin, 1998). Epidemiological data are also consistent with these findings: a strong inverse relationship exists between the mean consumption of n-3 fatty acids

in a population and the prevalence of both major depression and postpartum depression (Hibbeln, 1999). It is possible that individuals could have depression-induced changes in diet that lead to biochemical changes in blood; however, it is difficult to conceive of how depression in a subset of the population could result in an overall change in the consumption of n-3 fatty acids. If this is more than a simple correlation, it is more likely that the changes in fatty acid intake in the population are leading to changes in levels of depression (Peet & Horrobin, 2002).

Several recent randomized controlled trials (RCTs) have compared Omega-3s with placebo in the treatment of major depressive disorder (Nemets, Stahl, & Blemaker, 2002; Peet & Horrobin, 2002; Silvers, Woolley, Hamilton, Watts, & Watson, 2005; Su, Huang, Chiu, & Shen, 2003); these studies are summarized in Table 2. Su et al. (2003) studied the effect of Omega-3 supplementation in a sample of Taiwanese outpatients diagnosed with MDD. Fourteen patients were assigned to take 2200 mg of EPA and 1100 mg of DHA per day, and 14 took placebo capsules. After 8 weeks of treatment, the HRSD scores of those in the Omega-3 condition were 61% lower, and the scores of those in the placebo condition were 29% lower, a difference that was statistically significant. This study was careful to exclude any patients who were diagnosed with any other Axis I or Axis II disorders, eliminating the possibly confounding factor of comorbidity. Unfortunately, nearly all patients in each group were concurrently receiving antidepressant medication, making it difficult to determine whether the Omega-3 would have been helpful alone or only as an adjuvant to medication. Although the sample size in this study was quite small, the marked therapeutic effect demonstrated is encouraging.

Nemets, Stahl, and Belmaker (2002) assigned patients who were not responsive to antidepressant medication after at least three weeks of treatment (i.e., had a current diagnosis

of MDD) to take 2 g of EPA or a pill placebo each day. The mean reduction of the HRSD depression scale score was significantly higher for patients receiving E-EPA (12.4 points), compared with patients receiving placebo (1.6 points). This reduction was clinically meaningful: six of 10 patients receiving E-EPA but only one of 10 patients receiving placebo achieved a 50% reduction in Hamilton depression score. Because all patients were on antidepressant medication, it is again not possible to distinguish whether E-EPA augments antidepressant action or has independent antidepressant properties of its own.

Not surprisingly, the dose of EPA appears to be an important determinant of its therapeutic effect. Silvers and colleagues (2005) assigned patients to take a dose of fatty acids containing 0.6 g of EPA and 2.4 g of DHA. This level of EPA— .06g—is lower than the dosage used in other studies of omega-3s for depression (1000 mg to 2200mg daily). After 12 weeks, there was no difference in depressive symptom reduction for those taking omega-3s and those taking placebo. This may be because the supplements these patients were taking did not contain sufficient amounts of EPA or because the ratio of EPA to DHA was not optimal.

One study to date has attempted to directly determine the most effective dose of EPA supplementation (Peet & Horrobin, 2002). Patients in standard outpatient therapy who were not responsive to treatment were randomly assigned to take either 1 g, 2 g, or 4 g of EPA per day, or a placebo. After 12 weeks, the group receiving 1 g of EPA per day had significantly superior symptom reduction in comparison with the placebo group (53% vs. 29%). These results are comparable with those observed in previous studies of omega-3s. The groups receiving higher dosages of EPA did not show significantly better results than placebo, although there were insignificant trends in that direction. Although this preliminary study was too small to draw firm conclusions, together with the study by Silvers and colleagues (2005)

it indicates that 1 g of EPA may be the lowest amount of EPA that has significant antidepressant effects.

A very recent study (Freeman et al., 2006) randomly assigned patients with postpartum depression to take 0.5g, 1.4g, or 2.8g of Omega-3 fatty acids per day. Patients were included in the study only if they were not taking any antidepressant medication. These patients evidenced significant improvement from baseline, with an average reduction in symptoms of 48.8% on the HRSD. Despite the limitation of not having a placebo group, this study indicates that omega-3s may be an effective stand-alone treatment for a specific type of depressive disorder.

The literature examining the antidepressant effects of omega-3s is still in its early stages. However, the imbalance of omega-3s in depressed individuals, the epidemiological data linking low levels of omega-3 consumption with higher rates of depression, and the preliminary evidence of omega-3's antidepressant efficacy all point to the potential utility of using omega-3 supplements to treat current depressive episodes and prevent relapse.

Light exposure

Clearly, modern humans spend substantially less time outside than did their Stone Age ancestors, who were generally outdoors for the better part of each day (Deacon, 1999). Because interior light is much dimmer than outdoor light, it is possible to estimate how much time people are spending outdoors simply by measuring the total amount of light to which they are exposed. In a recent study of 150 community residents in San Diego who wore digital computer monitors of illumination exposure for 3 days during September or August, the median participant spent only 58 minutes per day directly exposed to the daylight. Moreover, the less time participants spent in daylight, the higher they scored on a scale of depressive symptoms (Espiritu et al., 1994).

Researchers have hypothesized that the shorter photoperiod and the decrease in sunlight exposure experienced by people living at higher latitudes during the winter is the main trigger for major depressive episodes of a seasonal subtype (Eastman, 1990), and bright light therapy has been shown to reduce or eliminate symptoms of seasonal depression (Rosenthal, 1993). Researchers have focused attention on the possibility that environmental light may be able to influence hypothalamically mediated functions such as mood and circadian rhythm by suppressing cerebral melatonin (Neuhaus & Rosenthal, 1997). Over the past two decades, light exposure has been examined as a treatment for psychiatric disorders including seasonal affective disorder, MDD, and bipolar disorder. A number of studies have examined the possibilities that bright light may be related to depressive symptoms, and interventions involving bright light exposure may be effective in relieving symptoms of MDD.

Kripke (1998) reviewed RCTs of *nonseasonal* major depression and concluded that light therapy brings about acute symptom reduction of 12 to 35%, usually within one week of administration. Studies in this review typically used 2-3 hours of 2000-3000 lux light daily for up to 4 weeks from fluorescent fixtures. There was not clear evidence that nonseasonal MDD responds better to morning or evening light; thus, Kripke suggested that time of day should be determined by patient's sleep timing. Patients may benefit from treatment immediately, and continue to benefit for several weeks. A more recent review of light therapy (Tuunainen, Kripke & Endo, 2004) evaluated RCTs for non-seasonal MDD with a placebo control and concluded that, among high-quality studies, treatment response was significantly better in the bright light groups than in placebo control groups. RCTs of bright light therapy for depression are summarized in Table 3.

Prasko et al. (2002) assigned 34 inpatients with MDD to receive morning bright light therapy (5000 lux) plus imipramine, bright light therapy plus placebo, or dim red light (a control condition) plus imipramine. Patients receiving bright light plus placebo improved more than those in the other two conditions (67% achieved remission in comparison with approximately 36% receiving light + medication and 33% receiving dim light + medication), although there was no statistically significant difference between the groups.

The most recent and methodologically sound study for light therapy and depression evaluated light as an adjunct to pharmacotherapy for MDD (Martiny, Lunde, Unden, Dam, & Bech, 2005). One hundred and two outpatients who met DSM-IV criteria for MDD were randomly assigned to receive sertraline plus either bright light (2500 lux) for 1 hour each morning or dim light (50 lux) for 30 minutes each morning. After 5 weeks of treatment, 71% of the patients in the bright light group were considered treatment responders (defined as a 50% reduction in symptoms on the HRSD), compared with 39% of the dim light group.

In addition to determining light therapy's effectiveness for depression, researchers have attempted to establish how bright the light must be and how long and how often patients must be exposed to it. Bright light is measured in a unit called lux, with 10,000 lux corresponding to the typical luminance of a sunny day. Overall, these studies suggest that illumination of 1000-2500 lux for at least 60 minutes is usually required for maximum melatonin suppression (McIntyre, Norman, Burrows, & Armstrong, 1989), although there is evidence that the higher the intensity of light used, the shorter the duration that is effective (Tuunainen, Kripke & Endo, 2004). Tuunainen and colleagues' review found that trials with longer duration of light treatment did not differ in results from trials with shorter duration of light exposure (e.g., 70 minutes per day). Even though prescribed light exposure in clinical

trials among inpatients is typically at least an hour a day, this often proves impractically long, and could possibly lead to problematic adherence among an outpatient sample.

Sleep

Over this past century, the average duration of sleep per night in developed countries has decreased from 9 hours to 6.9 hours (National Sleep Foundation, 2002). Given that modern Americans have the ability to leave the lights, television, and computer on all night if they want, they have found it increasingly tempting to stay up later and later. Sleep abnormalities have been found up to 60% of outpatients with MDD (Armitage, 2000). Patients often experience one or more of the following symptoms: trouble falling asleep, early morning awakening, restless or disturbed sleep, or hypersomnia.

Dysregulations in sleep are also associated with depression onset. A recent meta-analysis found that sleep disturbance was the second biggest risk factor for late-life depression after recent bereavement (Cole & Dendukuri, 2003). Studies of individuals with a sleep disturbance due to jet lag find increased rates of depression (Katz, Knobler, Laibel, Strauss, & Durst, 2002). Insomnia has also been found to increase the risk of developing MDD (Breslau, Roth, Rosenthal, & Andreski, 1996; Hohagen, Rink, Kappler, & Schramm, 1993). In a recent study of elderly individuals with no prior history of mental illness, participants with persistent insomnia had a risk of developing MDD during the one-year follow-up period that was 3.5 times greater than that of participants without insomnia (Perlis et al., 2006). There is also evidence that insomnia at depression onset greatly increases the likelihood of remaining depressed (Pigeon et al., in press).

Clinicians have long recognized the prominence of sleep problems in patients with depression, and have sought to relieve these symptoms either through use of sedative hypnotic medications or psychological interventions, including relaxation training, stimulus

control training, sleep restriction therapy, and cognitive therapies. Such psychotherapeutic interventions are often combined in a multi-component approach known as cognitive-behavioral therapy for insomnia (CBT-I). Effect sizes for CBT-I and some of its components are comparable to those observed with 2-5 weeks of treatment with hypnotic medications (Smith et al., 2002). However, most targeted patients have been diagnosed with primary insomnia (who may or may not have MDD), so the efficacy of targeting insomnia specifically among depressed patients is somewhat unclear.

Two preliminary uncontrolled studies have looked at the specifically at the effect of CBT-I in reducing depression symptoms among patients with insomnia (Morawetz, 2003; Kuo, Manber, & Loewy, 2001). One study found that a 6-week self-help program for insomnia (consisting of stimulus control, relaxation, and cognitive components) resulted in substantial improvement in sleep among a sample of insomnia patients, two-thirds of whom had at least mild depression (Morawetz, 2003). Among those who were initially depressed, 57% of the insomnia treatment responders experienced clinically significant improvements on the BDI (the author did not specify how this was operationalized). In another study, patients with or without depression were treated for insomnia with seven sessions of CBT-I. The overall severity of depression scores was reduced by 58% among participants who had experienced elevated depression scores at baseline (Kuo, Manber, & Loewy, 2001).

Sleep problems are the most commonly occurring residual symptom remaining after successful treatment for depression, reported among 44% of patients (Nierenberg et al., 1999). Although the evidence in favor of combining treatment for insomnia with treatment for depression is preliminary, it seems likely that addressing sleep problems in patients in depression will not only improve the short-term outcome of their depression, but also reduce the risk for recurrence.

Social support

The social structure of modern American life is dramatically different from that of our Stone Age ancestors, among whom social isolation was virtually unknown (Chagnon, 1992). Whereas Pleistocene-era humans typically lived out their lives in small bands of 50 to 150 individuals, surrounded by close friends and family members for decades, we live increasingly isolated lives in a global village of 6.5 billion. Such differences are also evident when comparing the modern American lifestyle with the corresponding way of life even 50 or 100 years ago. Today, approximately one quarter of American households consist of a single person, compared with 8% in 1940 (the figure would have been roughly 0% in ancestral environment) (Wright, 1995). As noted by sociologist Robert Putnam (2005) in his influential book *Bowling Alone*, over the past 100 years, there has been an increasing loss of community and social connectedness, as evidenced by the plummeting proportions of Americans voting, attending church, participating in civic events, and attending other community meetings (Putnam, 2000). Depression is characterized by social withdrawal, and in the modern environment, it all too easy for most people to withdraw completely from others if they so choose. In the ancestral environment—or even the environment of the early 20th century—this would have been virtually impossible. The very structure of society meant that people were forced to be around others, continually living and working in close quarters with their friends and family members.

The dissolution of social ties in modern society may be having profound effects upon the rate of depression. Greater social integration, particularly in the form of intimate ties with a spouse, children, friends, and significant others, has been shown to confer consistent, protective effects against the onset of MDD (George, 1989). Likewise, the disruption of such

ties has also been shown to increase the risks for depression and general psychological distress (reviewed in Seeman, 1996).

A substantial literature spanning over two decades of observations across varying populations has demonstrated that social support attenuates the power of negative life events to trigger depressive symptoms (e.g., Cohen, McGowan, Fooskas, & Rose, 1984; Lin, Dean, & Ensel, 1986). For example, Cohen, Mermelstein, Kamarck, & Hoberman (1985) found that both student and adult samples reported more symptoms of depression and of physical ailments when they were under stress but that among those who perceived that support was available from their social networks these associations were attenuated.

Social support has also been found to be related to treatment outcomes for patients in a depressive episode. For example, Ezquiaga, Garcia, Pallares, and Bravo (1999) followed up 90 patients with MDD for 12 months to evaluate factors related to remission and symptom improvement. Social support was one of the factors most strongly associated with complete remission. Likewise, a study of 3-year changes in depression among the elderly found that baseline measures of social integration, including reporting more contacts with children and close friends, were associated with declines in depressive symptoms at follow-up (Oxman, Berkman, Kasl, Freeman, & Barrett, 1992).

There are a number of theories that have been proposed to explain how social support alleviates the impact of stress. Social support may provide a solution to the problem by providing direct aid (e.g., monetary), by minimizing the perceived importance of the problem, or by providing a distraction from the problem (Cohen, 2004). "Social integration is also thought to influence one's sense of self and one's emotional tone. Role concepts that are shared among a group of people help to guide social interaction by providing a common set of expectations about how people should act in different roles. In meeting normative role

expectations, individuals gain a sense of identity, predictability and stability; of purpose; and of meaning, belonging, security, and self-worth” (Cohen, 2004, p. 678-679).

One of the most prominent symptoms of depression for many individuals is withdrawal from social activities and relationships. Accordingly, some researchers have suggested that working with clients to repair and maintain social relationships would confer a great deal of protective benefit against depressive symptoms (Beeber, 1999). There is evidence that working with currently depressed patients on relationship issues using the model known as interpersonal therapy (IPT) can be as effective as antidepressant medication and CBT in relieving depressive symptoms (Elkin et al., 1989; for review, see de Mello, de Jesus, Bacaltchuk, Verdeli, & Neugebauer, 2005). In IPT, the emphasis is on enhancing the quality of current interpersonal relationships, specifically, helping the patient to recognize and alter maladaptive interpersonal interactions.

Rumination

Rumination, the tendency to engage in repetitive negative thinking, is a key cognitive characteristic of depression (Ingram, 1984; Teasdale, 1983) and it often occurs in individuals who are lacking social support (Kuehner & Bueger, 2005). For people with MDD, rumination can involve focusing on symptoms of depression, as well as negative life event precipitants and sequelae of depression. Unfortunately, rumination does not help people do anything to relieve their symptoms, and people who ruminate in response to a negative event generally fail to use problem solving to cope effectively (Nolen-Hoeksema & Morrow, 1991).

Rumination has been associated with prolonged and more severe depressive symptoms in both experimental and naturalistic studies. Ruminative response styles have been found to predict the onset of depressive episodes among nondepressed populations, even when baseline depressive symptoms are controlled (Just & Alloy, 1997). Nolen-Hoeksema

(1991) found that individuals who respond to a negative mood with a ruminative style are at higher risk for severe and prolonged periods of distress and developing a full-blown depressive episode. Rumination can predict severity and chronicity of depressive symptoms (Lam, Smith, Checkley, Rijdsdijk, & Sham, 2003).

When either moderately depressed participants or participants in whom a depressed mood are induced to ruminate in a laboratory setting, their depressed mood is maintained, whereas forcing them to focus on distracting external stimuli leads to a reduction in depressed mood (Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema & Morrow, 1993). Participants diagnosed with MDD are able to focus attention away from themselves and ruminative thoughts in laboratory studies and experience a resulting decline in level of depressed mood (Fennell & Teasdale, 1984; Gibbons, et al., 1985). For instance, Fennell and Teasdale studied the effect of distraction on the mood of 16 participants diagnosed with depression on the RDC and a score above 19 on the BDI. Participants reported their thoughts while either concentrating on slides depicting outdoor scenes with an accompanying verbal description (distraction), or on a square of white light (control). Those in the distraction condition reported a modest decrease in depressive mood, while those in the control condition reported a dramatic increase in depressive mood. This study suggested that in the absence of a distractor, negative ruminations can emerge unchecked, and that depressed patients should avoid completely unstructured periods of time.

Several features of ancestral hunter-gatherer lifestyle helped combat rumination. Prehistoric humans spent much of their time engaged in activities like hunting, foraging, building dwellings, and walking long distances for water and other resources (Molnar, 2005). When not involved in activities geared toward survival, ancestral people participated in rituals and meals, and socialized with each other (Deacon, 1999). They rarely spent time

alone, and had little unstructured time alone to spend lost in a toxic, ruminative thought process. Even as recently as the early 20th century, society lacked many of the isolating elements like television and computers that are pervasive today. On the other hand, modern life is gives people plenty of opportunities to ruminate. People spend a great deal of time involved in activities that do not necessarily involve other people; for instance, Americans spend over 30 hours a week watching television (ABC News online, 2004), and the average American spend 24.3 minutes per day commuting to and from work, 77% of them driving by themselves (Leonard, 2005).

Participation in engaging activity can counteract rumination, and dysphoric mood is negatively associated with pleasant events (Grosscup & Lewinsohn, 1980). In one study, people with a ruminative style recognized that pleasant or distracting activities would lift their mood, but were unwilling to do them (Lyubomirsky & Nolen-Hoeksema, 1993). The diagnostic criteria for depression include a loss of interest in most or all activities (American Psychiatric Association, 2000), and individuals with MDD tend to exhibit a pronounced withdrawal from activities they used to find pleasurable. Thus, a challenge for clinicians treating depression is finding strategies to motivate patients to replace rumination with pleasant and distracting activities.

One therapy has been developed specifically with this aim. Metacognitive therapy for depressive rumination (Wells & Papageorgiou, 2004) focuses on helping the patient become aware of what rumination is, to recognize when he or she is doing it, to realize how detrimental rumination is, and learn and implement strategies to stop it. Metacognitive therapy, while sharing some similarities with traditional CBT, focuses more on educating patients on the process of rumination and its toxic nature, rather than examining the content of the rumination per se. The major strategies used in metacognitive therapy are activity

scheduling, detached mindfulness, modifying underlying beliefs, attention training, and decatastrophizing emotion. Preliminary evidence suggests that components of this treatment may be effective, although the integrated approach remains to be tested in a controlled evaluation (Wells & Papegeorgiou, 2004).

Another related therapy that has been used effectively with depressed populations is behavioral activation. Behavioral activation (BA), which is a treatment for depression focused on increasing patient activity and access to reinforcement, has been shown in preliminary research to be as effective as cognitive therapy and pharmacotherapy in reducing depressive symptoms (Jacobson et al., 1996; Martell, Addis, & Jacobson, 2001). Significantly, a major focus of the BA protocol concerns teaching patients to use engaging activity as a means of reducing the frequency, intensity, and duration of rumination episodes. Specific strategies include self-monitoring, scheduling daily activities, rating the degree of pleasure experienced during these activities, exploring alternative behaviors, and moving attention away from the ruminative thoughts toward direct, immediate experience (Dimidjian, et al., in press). Conceptually, BA is different from traditional CT for depression in that it does not involve specific cognitive interventions; in fact, in a recent clinical trial comparing the two, therapists were explicitly instructed to avoid cognitive strategies while administering the BA protocol (Dimidjian, et al., in press).

Behavioral activation may work especially well to combat rumination because in an ancestral environment people were forced to engage in a number of goal-directed activities that were gratifying in the short-term. Failing to engage in activities like hunting, food gathering, and shelter construction had immediate and disastrous consequences in terms of physical well-being.

Therapeutic Lifestyle Change

These six lifestyle factors—exercise, light exposure, Omega-3 fatty acids, rumination, socialization, and sleep hygiene—have each been linked to the onset and maintenance of MDD. The significant differences between the ancestral and modern lifestyle on each of these dimensions suggest the possibility that the modern epidemic of depression may be, in part, a result of such changes. In fact, depression may plausibly be characterized as a stress response that goes unchecked by external environmental factors. As suggested by a number of evolutionary theorists, short-term dysphoria probably has adaptive value (e.g., Nesse, 1999). Ideally, individuals would remain dysphoric for a short period of time in response to a stressful event. However, rather than descending into a long-term depressive episode, it would be most adaptive for them to return to a normal state relatively quickly. The observed relationship between the aforementioned lifestyle elements and onset and maintenance of depression suggests that these environmental factors are among those that should help prevent short-term dysphoria from becoming long-term major depression.

Therefore, it is reasonable to examine the extent to which an efficacious intervention may be designed that specifically targets these modifiable lifestyle elements. Accordingly, over the past 16 months, our research team, under the direction of Dr. Steve Ilardi, has worked to develop a therapy protocol, Therapeutic Lifestyle Change for depression (TLC), designed to target these lifestyle factors. It is the aim of the present investigation to examine the feasibility (in terms of patient adherence and compliance) and efficacy (in terms of significant and clinically meaningful reduction of depressive symptomatology) of such an acute intervention in a preliminary study of approximately 30 individuals diagnosed with MDD. Additionally, the degree to which those reductions compare favorably with a small (n=12) treatment-as-usual control group will be examined.

Method

Participants

Participants were recruited through fliers, community referrals, in-class announcements, and newspaper, magazine, and television news coverage. Approximately 228 interested individuals called and were screened by telephone. In this initial screening, they were asked the first nine questions from the Structured Clinical Interview for DSM-IV Disorders (SCID; First, Spitzer, Gibbon, & Williams, 1997) mood module to determine the likelihood of their receiving a diagnosis of major depressive disorder. Approximately 115 likely candidate participants were invited to be evaluated in person (by myself or another trained graduate level research assistant) to determine eligibility. This evaluation included completion of the SCID mood disorders, substance abuse, and psychotic disorders modules, the Beck Depression Inventory (BDI-II, Beck, Rush, Shaw, & Emery, 1979) and Hamilton Rating Scale for Depression (HRSD, Hamilton, 1960) to determine baseline ratings of depressive symptomatology. Subjects were eligible to participate if they received a current SCID-based diagnosis of major depressive disorder according to the DSM-IV diagnostic criteria, were between the ages of 18 and 65, and did not have psychotic symptoms, a substance abuse diagnosis, a history of self-harm behavior during the past two years, or active suicidal ideation.

Participants were not screened specifically for the presence or absence of anxiety disorders. In general, studies of interventions for depression do not use co-occurring anxiety disorders as exclusionary criteria (e.g., Murphy, et al., 1984; DeRubeis et al., 2005). Although presence of an anxiety disorder often marks a more severe case, the majority of depressed patients suffer from clinically significant comorbid anxiety (Lydiard, 1991). In fact, one common anxiety disorder, generalized anxiety disorder, shares 4 symptoms in common with major depressive disorder (APA, 2000). In one case, it became clear that a

potential participant, while reporting many symptoms of MDD, had a primary diagnosis of post-traumatic stress disorder. For this reason, she did not appear to be an appropriate candidate for TLC, and she was screened out of the study.

Measures

Participants were assessed by trained graduate students on the mood, substance abuse, and psychotic modules of the SCID. The SCID is a structured interview which uses standardized clinician-directed queries designed to assess Axis I conditions including depression. Research has provided evidence of the reliability of Axis I diagnoses assigned on the basis of the SCID, with interrater agreement kappas ranging from .70 to 1.00 in community and clinical samples (Segal, Hersen, & Van Hasselt, 1994). In fact, the SCID is considered the “gold standard” of diagnostic classification in clinical research settings due to this high level of interrater reliability.

The primary outcome measure for this study was the BDI-II, a widely used self-report measure for depression that includes 21 items, each of which is scored from 0 to 3 to reflect the intensity of corresponding depressive symptoms. The respondent's score is the sum of these item scores and can range from 0 to 63. The BDI-II and its predecessor, the BDI, have been the most widely used self-report measures of outcome in research on cognitive therapy for depression (Beck, Steer, & Garbin, 1988). Psychometric studies indicate that the BDI has high internal reliability, with an estimated coefficient alpha of .92 for psychiatric patients (Beck, Steer, & Brown, 1996).

The 17-item HRSD is a widely used clinician-rated scale that covers a set of affective, behavioral, and biological symptoms of depression, with scores ranging from 0 to 52. The HRSD has been found to have acceptable psychometric properties, with interrater reliability coefficients ranging from .83 to .94 across different studies (Rabkin & Klein,

1987). The HRSD correlates relatively highly with the BDI, with studies showing a range of correlations from .68 to .72 (Beck, Steer, & Brown, 1996). The HRSD was included as a secondary outcome measure due to its widespread usage in the psychiatric literature. However, administering the HRSD in a reliable fashion represents a relatively expensive investment in terms of training and rater time, and there are logistical constraints in terms of when patients are willing to come in to be assessed. Although efforts were made to train graduate research assistants thoroughly and consistently, and provide adequate supervision, interreliability checks were not conducted due to limited resources. However, the observed aggregate correlations between the HRSD and BDI-II in the present study ($r=.78$) provides compelling support for the validity of this study's HRSD ratings.

Adherence to TLC homework assignments was measured by asking the patients to record on Weekly Record Forms (Appendix A) each day the degree to which they were following the recommended lifestyle changes and a rating of their mood that day (each time a new lifestyle change was introduced, patients were required to begin tracking their adherence to it). The Weekly Record Forms were developed by our research team and were modeled after the Diary Cards widely used in Dialectical Behavioral Therapy (DBT; Linehan, 1993). The Weekly Record Forms begin by asking the patient to record whether they have taken the Omega-3 and fish oil supplements, a baseline measurement of sleep and exercise, and a rating of their mood on a Likert scale from 1 to 10. As successive lifestyle changes were introduced, patients were asked to record their adherence to corresponding homework assignments.

For hours of sleep, patients were given a score for compliance calibrated as the percentage of the targeted 8 hours of sleep obtained each night. Hypersomnolent patients had their compliance rating reduced by a commensurate percentage for every hour *above* 8 hours per night. For bright light exposure, a patient was considered 100% compliant if he or she got

30 or more minutes per day. Otherwise, compliance was rated as a percentage of the targeted 30 minutes each day and averaged across the weeks for which we collected data. Likewise, patients were considered 100% compliant with the exercise requirement if they got 35 or more minutes of exercise three times a week. Anything less was rated as a percentage of this target, and a weekly average calculated. Patients reported whether they had taken their omega-3s and multivitamin for the day, so adherence was measured by averaging the number of days that patients reported they took them. Pleasant activities were measured as the percentage of days per week that patients reported engaging in them. Patients were asked to give themselves credit for three things as a way of providing social self-support each day following Session 7, which included material on esteem maintenance. The percentage of times they recorded doing this is reported for this variable. Patients were only asked to formally record social activity for one week; thus, these data were not reported in this analysis.

Procedure

One-third of eligible study patients were randomly assigned to a waitlist control condition and two-thirds assigned to receive active treatment in a TLC group. Power analyses suggested that sufficient power could be obtained by assigning half as many patients to the waitlist control group, and due to ethical considerations it was important to get as many patients into treatment immediately. Random assignment was achieved by using a random number generator to assign each participant a number between 1 and 100, with those receiving numbers between 1 and 33 assigned to the waitlist. Participants randomized to the active treatment group were invited to join the first available group, typically beginning within a few weeks of the intake screen. Those in the control condition were encouraged to seek treatment as usual in the community, and provided information as well as a referral sheet

with contact information for Bert Nash, KU's Counseling and Psychological Services, the KU Psychological Clinic, Headquarters crisis hotline, and Teakwood Psychological Resources. After 14 weeks on the waitlist (a period commensurate with the duration of the TLC group), they were invited to join a TLC group. At this point, they were re-assessed with the SCID, BDI and HRSD by trained graduate students, and reimbursed at the rate of \$12 and hour for their time.

Each participant completed the BDI during the first five minutes of group each week. Additionally, each participant was re-assessed on the HRSD by a graduate student rater at the fifth session, the ninth session, and the final twelfth session. Raters were not explicitly told what treatment condition the patients were in. However, because HRSD assessments for TLC participants were typically scheduled before and after group sessions, it is likely that raters were not effectively blind to treatment status.

Description of Protocol. Therapeutic Lifestyle Change groups followed a detailed 12-session protocol, developed by the members of the TLC Research Group under the direction of Dr. Steve Ilardi at the University of Kansas. Each part of the protocol was written by Dr. Ilardi, myself, or a graduate research assistant in the lab, and I oversaw the compilation and editing of these pieces into the final draft of the protocol (Appendix B). In addition, the TLC lab developed a set of patient handouts corresponding to each session of the group. An outline of the sessions is included in Table 4, and a brief description of the structure and content of the group sessions is provided in this section.

The first TLC session is the most psychoeducational in nature. The group co-leaders outline the evolutionary rationale behind the program, emphasizing ways in which our modern environment is different from the ancestral environment and why this is important for depression. Co-leaders also conduct an exercise in which they describe the major areas of

functioning affected by depression (mood, cognition, behavior, and physiology) and invite group members to share symptoms they have experienced. The group concludes with a discussion of the role of diet on neurological function and distribution of the Omega-3 fatty acid supplements (with instructions on how to take them). Homework for the first session consists of taking the Omega-3 supplements with a multi-vitamin, beginning to record daily activities and mood on the weekly record form, and becoming aware of and monitoring when and how much they are ruminating.

Sessions 2 through 7 (and session 9) all follow the same basic format. The first 45 minutes of the session are spent reviewing homework from the week before. Homework assignments involve implementing a lifestyle change based on the psychoeducational topic for that week. When patients report problems with adherence, group members and leaders work to find solutions to obstacles. In the second part of each session, new material for that week is introduced. In the second week, members learn how to use behavioral activation strategies to combat rumination. In the third week, the concept of antidepressant exercise is introduced, and exercise consultants are present at the meeting to schedule each member's first workout. Each group member meets with an exercise consultant for three one-hour sessions in the three weeks following the exercise session to develop a workout plan and learn to monitor heart rate (i.e., to ensure that each workout is of aerobic intensity). During the next four group sessions, members are taught to get daily bright light exposure, to enhance social connectedness, develop better sleep hygiene, and to address the corrosive effects of the modern social environment upon self-esteem. There is a light box available in Fraser Hall for patients to use when the weather is not sunny.

Sessions 8, 10, 11, and 12 are all devoted to review and relapse prevention. Session 11 takes place in the twelfth week of the program, and session 12 takes place the fourteenth

week. Spacing the final sessions out gives patients practice maintaining the lifestyle changes without the support of the group and co-therapists. During these final sessions, patients learn importance of continuing to adhere to the lifestyle changes, troubleshoot obstacles to adherence in advance, and assess which elements were particularly helpful for them in overcoming depression.

The introduction of the material follows a specific order. Nutrition is the first major topic introduced, based on the rationale that taking a nutritional supplement and multivitamin is a relatively easy assignment that most patients should achieve success with. Also in the first session patients are asked to notice when they are ruminating but not to initiate any intervention to stop its occurrence. Again, this is a relatively easy assignment, and once patients notice what rumination is, they are often much more motivated to learn and implement behavioral strategies to combat it, which is the assignment for the second session. Exercise is introduced in the third session, with the idea being that this is early enough that the therapists will have time to help patients get in a regular exercise routine, but late enough so that patients will have had several success experiences and feel confident in their ability to make this change. Light exposure is introduced next, in the fourth session, since it is a major change, and also a change that some patients see benefit from relatively quickly. Socialization and sleep strategies are the last two major elements introduced because they are more easily modifiable in patients who have already begun the recovery process. Esteem maintenance and Flow are introduced late in the protocol because they can be considered extensions of, respectively, socialization and behavioral activation.

Aside from the group meetings, the co-therapists also contact each member of the group by phone weekly for the first three weeks, and biweekly after Session 4. Phone calls are targeted to last no longer than 15 minutes apiece, although there is not a strict limit. There

are several reasons for these phone calls. At the beginning of therapy, the phone calls are an important way to build rapport, address any concerns the patient might have hesitated to bring up in front of the rest of the group, and begin to get to know the patient on an individual basis. As therapy progresses, the phone calls become much less important for the patients who are adhering well and seeing rapid symptom improvement, but for those who are struggling more, they become a way for the therapist to troubleshoot problems more thoroughly outside of the group context.

Initial Pilot Group. After developing a preliminary version of the TLC manual, we decided to run a group through the protocol to determine whether changes needed to be made before finalizing it. We recruited five pilot group members through announcements in large psychology classes, fliers distributed around campus, and an announcement on the student radio station. This 10-session group, co-led by Dr. Ilardi and myself, was relatively successful: there were no dropouts, and the average pre-post reduction in depressive symptoms among the members on the BDI was 55%. Four out of 5 group members achieved remission according to DSM criteria.

Based on feedback from the group members, and our experiences as group leaders, we decided to make several changes to the group format before running the groups that are included in the main analyses of this paper. First, we expanded the protocol from 10 to 12 sessions in order to give the group more time to make targeted lifestyle changes. Second, because the first five sessions felt somewhat rushed with this group, we decided to spread out the material from the beginning of the protocol more. Rather than emphasizing two or even three changes per week, we decided to devote a full session to each major lifestyle change. Third, in this pilot group, we noticed that at the beginning of the process a couple of the group members missed meetings and seemed somewhat ambivalent about being a part of the

group. In order to address these concerns individually, we made brief (10 to 15 minute) phone calls from group leaders to the members approximately every other week a standard part of the protocol.

Results

Patient Characteristics

Forty-three patients (aged 18-62 years; mean=38.2) met study inclusion criteria and were randomized into active treatment (n=31) or the waitlist control condition (n=12). The primary reasons for patient exclusion were failure to meet criteria for MDD, a history of bipolar disorder, active suicidal ideation, and current substance abuse problems. Of the patients who met final entry criteria, 31 were assigned to the therapy condition, and 12 to the waitlist condition (Table 5). In order to determine whether participants in the two groups were significantly different from each other, chi square analyses were conducted on categorical variables, and t-tests were performed on dimensional variables. The two treatment groups did not differ significantly with respect to age ($P=.44$), sex ($P=.55$), level of education ($P=.14$), marital status ($P=.28$), race ($P=.30$), baseline BDI scores ($P=.23$), baseline HRSD scores ($P=.98$), number of previous episodes ($P=.236$), or whether participants were currently in psychotherapy ($P=.76$) or taking medication ($P=.28$).

Eleven patients out of 31 (35.4%) who entered TLC were in therapy at the time of screening, and 12 (38.7%) were on antidepressant medication. Seven patients (22.5%) were both in therapy and on medication, 4 (12.9%) were only in therapy, and 5 (16.1%) were on medication alone. Fifteen (48.4%) patients were not on medication or in therapy at the time of screening. Follow-up data on whether patients continued existing treatment or began another form of treatment while in TLC group was not collected.

At the time of the initial screening, 5 of 12 (42%) patients on the waitlist were in psychotherapy and 7 of 12 (58%) were on medication. Four patients were on both (33.3%), three (25%) were on medication only, and one (8.3%) was only in therapy. Four patients (33%) were not receiving treatment at the time of screening. One patient began to take antidepressants and to see an individual therapist during the waitlist period, while the rest continued with the same treatment they had been receiving at randomization. Two patients reported educating themselves about TLC with material available online (linked from Dr. Ilardi's website) and making to make lifestyle changes accordingly. These two patients were no longer depressed at the follow-up interview according to the SCID and did not enroll in a TLC group.

Adherence to Treatment

Patients in the active treatment group were considered non-completers if they missed more than 3 sessions or stated that they would no longer like to attend group; patients on the waitlist were considered dropouts if they failed to attend the follow-up assessment interview. Eleven of the 43 study (25.6%) patients dropped out and dropout rates did not vary significantly between the active treatment group and the waitlist control group ($\chi^2_1 = .012$; $P = .912$). Of the 31 patients assigned to the therapy group, 8 (25.8%) failed to complete the therapy. Three of those considered dropouts did not show up to the first meeting, while 5 began the therapy and dropped out at some later point. One of those that began but did not complete treatment did not report a reason for discontinuing therapy, while 2 cited scheduling difficulties. Two patients missed too many sessions to be considered treatment completers, although they continued attending through session 12. One additional patient was unable to continue attending sessions due to scheduling difficulties, but enrolled in a subsequent group

not included in this analysis. (Her data was not considered in any analyses except those concerning the characteristics of the patients randomly assigned to treatment.)

Of the 12 assigned to the wait-list control condition, 9 (75%) completed the second assessment (after 15 weeks) and thus were considered completers, and 7 (58%) went on to join a later therapy group. One of the dropouts could not come in for the follow-up meeting due to scheduling difficulties, 1 did not return our phone calls and 1 was unreachable (i.e., no longer had the same phone number). Study dropouts did not differ significantly from patients who completed the study on age ($F=.656$, $P=.42$), sex ($\chi^2_1=3.7$, $P=.054$), level of education ($F=.060$, $P=.80$), marital status ($\chi^2_1=2.7$, $P=.10$), race ($\chi^2_3=1.3$, $P=.73$), number of previous episodes ($\chi^2_2=1.0$, $P=.60$) baseline BDI score ($F=1.94$, $P=.17$), or baseline HRSD score ($F=.951$, $P=.34$).

Weekly Record Forms were analyzed to determine the degree to which patients in TLC actually made the major lifestyle changes. Estimates of adherence were obtained by averaging each of 6 variables for the weeks during which patients were asked to record them: bright light exposure, exercise, dietary supplements, pleasant activities, hours of sleep, and social self-support (Table 6). On average, patients demonstrated a fairly high level of adherence to these lifestyle factors, with an average adherence rating ranging from 65.9% for bright light exposure to 94.5% for omega-3 and multivitamin (Table 6).

Treatment Response

A power analysis was conducted to determine how many participants would be needed in order to detect treatment effects (within subjects) at a probability of .80 (Bernstein, Rothstein, Cohen, Schoenfeld, Berlin & SPSS, 2000). Results from the pilot group showed a large reduction in BDI scores from baseline to the end of treatment. Assuming there would be

a large effect size with subsequent groups as well, (at least 1 standard deviation change pre-post) a sample of 10 individuals in each treatment group yields a power estimate of .80.

A chi-square analysis was conducted to evaluate between-groups differences in treatment response, defined as a reduction of 50% or more from baseline on the BDI or HRSD (a definition of treatment response commonly used in clinical outcomes studies such as Trivedi et al., 2006 and Dunn et al., 2005). Using data from the treatment completers only (ie. those who completed at least 9 sessions in active treatment or who came in for a second assessment interview after 15 weeks on the waitlist), 19 out of 22 patients in the TLC treatment group (86.4%) achieved a clinically significant treatment response according to the BDI, compared to 2 out of 9 in the waitlist control group (22.2%). This difference was statistically significant ($\chi^2_2 = .12.511$; $P = .002$). On the HRSD, 15 out of 22 (68.2%) active group patients achieved a 50% reduction, compared with 2 out of 9 in the waitlist group (22.2%; $\chi^2_2 = 7.111$; $P = .029$).

The reduction in depression severity indicated by the BDI and HRSD was compared for patients in TLC groups and those in the waitlist control group. Analyses of covariance (ANCOVA) were conducted using each of the post-treatment outcome scores as the dependent variable and the corresponding baseline measure as the covariate. Preliminary analyses were conducted in all cases to confirm that the heterogeneity-of-slopes assumption was not violated.

The first set of analyses utilized the intent-to-treat principle. If no observation was recorded at the end of treatment, data were carried forward from the last observation to serve as the outcome variable. Three waitlist patients and 4 active treatment patients did not have interim or termination evaluations, and their intake scores were used as their endpoint scores.

The second set of analyses was conducted on only those patients who were considered completers.

Both groups exhibited a decline in depressive symptoms, and Table 7 provides the mean BDI and HRSD scores at study entry and at the end of the initial 15-week treatment period. Figure 1 shows the mean BDI scores as assessed at the initial screening and at each session of TLC. In the intent-to-treat analysis, the patients assigned to the TLC group had a significantly greater reduction in baseline symptoms of depression than those in the waitlist condition as measured by the BDI ($F_{1,39}=7.45$; $P=.009$). A similar pattern was observed with the HRSD, but it did not achieve statistical significance ($F_{1,39}=3.67$; $P=.063$). Likewise, in the completer analysis, patients assigned to the TLC group had significantly greater symptom reduction than those in the control group according to the BDI ($F_{1,28}=4.803$; $P=.037$), but not according to the HRSD ($F_{1,28}=2.10$; $P=.16$).

A secondary logistic regression was conducted to determine whether the likelihood of continuing to meet diagnostic criteria for major depressive disorder at the end of the 15-week treatment period differed depending on whether patients were in the active treatment or control group. Based on SCID interviews of treatment completers, 19 out of 22 (86%) of those patients in the active treatment group were no longer classified as clinically depressed, and 3 out of 9 (33%) of those in the waitlist control group were no longer clinically depressed. This difference was statistically significant ($P=.008$).

A chi-square analysis was conducted to compare the treatment response rate (using a 50% reduction in symptoms as indication of response) between TLC group members based on whether they were taking antidepressant medication at the time of randomization. Average baseline and termination BDI and HRSD scores according to whether patients were on adjuvant medication are listed in Table 8. There was no significant difference between

patients on adjuvant medication in their response rate according to BDI ($\chi^2 = .079$; $P = .96$) or HRSD ($\chi^2 = .15$; $P = .93$).

Discussion

A growing body of evidence supports the antidepressant efficacy of a set of modifiable lifestyle factors ranging from exercise (Blumenthal et al., 1999; Singh et al., 1997) to light exposure (Kripke, 1998) to sleep modification (Morawetz, 2003; Kuo, Manber, & Loewy, 2001) to dietary omega-3 intake (Nemets, Stahl, & Belmaker, 2002; Peet & Horrobin, 2002) to enhanced social support (Ezquiaga, Garcia, Pallares, & Bravo, 1999) – lifestyle factors that have become increasingly absent from the American way of life in recent generations. Significantly, these factors have not previously been integrated into a comprehensive, manualized depression intervention. Accordingly, this study provides the first reported empirical support for the hypothesis that a time-limited group therapy intervention based on lifestyle change is a feasible and efficacious treatment for depression.

Judging on the basis of published outcomes for extant pharmacological and psychotherapeutic treatments, patients in this study's Therapeutic Lifestyle Change (TLC) condition fared well. The majority of patients were able to complete the protocol successfully, and overall dropout rates and adherence data compared favorably with those reported in other large-scale studies of therapy and medication for depression (e.g., Elkin et al., 1989; Hollon, et al. 1992). Concurrent use of psychotropic medication did not explain the findings of symptom reduction among TLC patients.

TLC patients experienced clinically significant reductions in depressive symptoms as measured by both the BDI and HRSD. Among the 22 patients who completed the active TLC treatment condition, 19 (86%) no longer met DSM-IV criteria for MDD at treatment termination. The average pre-post reduction in depressive symptom severity (BDI score)

among treatment completers was 70%. Moreover, 86% of TLC completers experienced favorable treatment response, defined as at least a 50% reduction in baseline symptomatology, in comparison with only 22% of those in the treatment-as-usual control condition. These results support the efficacy of TLC as an alternative to traditional treatments for depression. In fact, across a range of pharmacological and psychotherapeutic interventions, it is typically observed that only about half of all depressed patients respond favorably to treatment (Hollon, Thase, & Markowitz, 2002; Trivedi et al., 2006). Thus, the observed reductions in depressive symptoms with TLC in the present study may be regarded as at least equivalent to those most commonly reported in the extant treatment outcome literature.

For instance, Dimidjian and colleagues (2006) found that, among patients who completed up to 24 sessions of cognitive therapy over 16 weeks, 56% were considered treatment responders (based on a BDI reduction of 50% or greater). Among patients on antidepressant medications for 16 weeks, 52% were considered responders. Similarly, in a recent large-scale study of citalopram response among 2,954 outpatients, Trivedi and colleagues (2006) reported that only 47% of study patients experienced at least a 50% reduction in self-reported depressive symptoms during acute pharmacotherapy.

Implications

TLC represents a potential alternative to traditional treatments for depression, which is significant inasmuch as pharmacological and psychotherapeutic interventions are acceptable to only a subset of patients – a fact that reflects in part the stigma often attached to such interventions (Ben Porath, 2002; Sirey et al., 2001). But there are other reasons for patient failure to initiate or adhere to traditional treatment approaches. Those amenable to psychotherapy for depression may not be always be able to find local clinicians with

appropriate expertise, and may encounter limited insurance coverage for such services even when available. Likewise, successful pharmacotherapy is often a challenging trial-and-error process, with prescribers not infrequently needing to adjust dosage, switch medication, or add on adjuvant forms of pharmacotherapy (Trivedi et al., 2006). And, of course, many patients will discontinue medications prematurely due to side effects or to a reluctance to stay on a psychotropic drug indefinitely (O'Neal, Dunn, & Martinsen, 2000). Participants in the present study often anecdotally reported that TLC felt like a more “acceptable” form of treatment because of its emphasis on lifestyle change, which made treatment sessions seem less like psychotherapy and more like attending a class; they have also noted that unlike medication, TLC interventions engendered few concerns about physical side effects or “addiction”.

A relatively common initial reaction to the TLC treatment approach among both laypeople and clinicians is one of skepticism regarding the ability of depressed individuals to make the targeted set of lifestyle changes, such as beginning an exercise program and increasing socialization. Habits tend to be self-sustaining, and getting people to make lifestyle changes tends to be difficult, whether or not they are depressed. Such changes would appear to be particularly difficult for patients who, by virtue of their disorder, experience symptoms like psychomotor retardation, loss of energy, and diminished interest in previously enjoyable activities. Certainly, *a priori*, we were not sure what to expect in terms of adherence to TLC recommendations. However, the high overall level of reported adherence – with the great majority of TLC patients implementing most or all targeted areas of lifestyle change – is extremely encouraging. Therapists also noted that many of their patients demonstrated differential adherence to the various lifestyle elements. Most of them tried everything we asked initially and eventually chose to adhere more closely to some of the recommendations.

Not only were patients able to adhere fairly well to an extensive set of recommendations for lifestyle change, but the observed overall treatment effects were very good. To our knowledge, this is the first time a therapy protocol for MDD has been developed in which several distinct interventions of known antidepressant effect are combined. Of course, in reported studies of treatment outcomes with combined medication with psychotherapy, there tends to be at best a modest additive effect from each treatment modality (Hollon et al., 2005). However, in the present study, observed reductions in depressive symptoms in TLC (70%) are somewhat larger than would be expected on the basis of any individual component. For instance, light therapy typically results in depressive symptom reductions of 12-35% (see review by Kripke, 1998), and both omega-3s (e.g., Nemets, Stahl, & Belmaker, 2002; Peet & Horrobin, 2002), and exercise studies have tended to result in an average of about 50% reduction in depressive symptoms among treatment completers (Dunn et al., 2005; Blumenthal et al., 1999). It remains an open question – and one for future investigation – whether the apparently superior effects achieved with TLC are due to the simple additive effect of combining treatments.

It could also be that TLC achieves a larger treatment effect than expected simply because it provides a “smorgasbord” of potentially efficacious options for patients to choose from. Because only a limited subset of depressed patients – typically about 50% - tend to respond favorably to any distinct treatment element, if the subset that happens to respond to one element (e.g., exercise) has only partial overlap with the subset that responds favorably to another (e.g., bright light exposure), it follows that exposing patients to numerous potentially efficacious treatment elements will increase the probability of their encountering at least one element that is efficacious for them. Anecdotally, at their exit interviews, a majority of TLC patients reported their perception that exercise and/or omega-3s had been for them the most

helpful of all six targeted lifestyle factors. However, every TLC element was identified as the “single most helpful” by at least one patient. This is consistent with the hypothesis that providing patients with a number of choices of antidepressant interventions may lead to superior outcomes because patients are predisposed to adhere or respond differently to each one.

The TLC protocol relies largely on straightforward behavioral intervention, and effective administration of TLC does not appear to be dependent on a high level of therapist skill or experience. In fact, of the 7 different therapists who led or co-led the five TLC groups used in the present analysis, 6 were graduate students, and 3 had less than 1 year of overall therapy experience. Because the protocol is relatively straightforward to implement, it appears likely that TLC could be easily disseminated, and used effectively by clinicians with widely varying experience and skill levels.

It is also notable that the TLC protocol was administered in *group* format, with results comparable to those seen in trials of individual psychotherapy. The use of a group protocol allows clinicians to deliver services to a greater number of individuals at a time, thus reducing the overall cost for individual clients. Thus, these results have potentially important implications for clinicians delivering services in a cost-conscious environment.

It is also notable that study participants tended to be patients with chronic, treatment-refractory depression. Beck, Steer, and Garbin (1988) suggest using a BDI threshold of 20 to indicate the presence of moderate depression and 30 to indicate severe depression. Among the 30 patients who were randomized to the TLC treatment condition, the average BDI score was 31.5. Nineteen (63.3%) had a BDI score above 30, indicating severe depression, and 80% of those for whom we have complete data (n=25) had endured at least 2 previous depressive episodes. More than half of patients entering the study were currently receiving medication,

psychotherapy, or both, but were still fully syndromal at the time of randomization. Failure in any mode of treatment is associated with poorer treatment response (e.g., Lustman, Freedland, Griffith, & Clouse, 1998; van den Broek, et al., 2004), yet patients receiving TLC still achieved a large reduction in depressive symptoms. In their mega-analysis of severely depressed patients who completed at least 12 weeks of treatment, DeRubeis and colleagues (1999) found mean improvements in depressive symptom levels of 49% with medication and 56% with CT using the BDI. Although preliminary, the overall magnitude of pre-post symptom reduction experienced by TLC patients – 70% – compares favorably with the results of past studies of severely depressed populations.

Methodological Considerations

There are several important limitations in the current investigation. Because this was a short-term (15-week) intervention study, it remains unknown how effectively patients will continue to maintain the changes they made to their lifestyle after they are no longer meeting regularly with their TLC therapy groups. It is also unclear how resistant the treatment effects will be to relapse over time, regardless of whether the lifestyle changes are maintained. Longitudinal follow-up of these patients is ongoing, and the effects of TLC over time will be evaluated in future analyses.

Study participants were volunteers for a well-publicized study that was described as examining the antidepressant effects of lifestyle change, including exercise, light exposure, dietary supplements, and sleep hygiene. Participants tended to be highly motivated individuals who often spontaneously expressed that they were drawn to the study based its rationale of a more “holistic” approach to the treatment of depression. Thus, it remains unknown how well these findings will be generalizable to other depressed populations that

may have lower motivation levels and less of a pre-existing interest in living a healthier lifestyle.

A critical limitation in this study is the absence of interrater reliability data on two of the principal outcome measures: the SCID and the HRSD. All SCID and HRSD interviewers were trained graduate students. Training for the SCID involved watching the standard SCID training tapes prepared at the New York State Psychiatric Institute by First and Gibbon (1996) for DSM-IV. Training for HRSD was done in a group format by Dr. Ilardi. Additionally, supervision was available from a licensed clinical psychologist (Ilardi), and any cases for which there was uncertainty as to the most accurate rating or diagnosis were brought to supervision or discussed with the TLC research team in order to reach consensus. The HRSD scores generally corroborated and were congruent with the BDI scores, although the magnitude of effects was somewhat smaller. The failure to achieve statistical significance was probably a result of low power, although the possibility of low reliability in the HRSD scores could have resulted a high measurement error

It is important to clarify that while TLC is conceptually distinct from existing psychotherapies for depression, there are also areas of overlap. TLC is an integrative therapy approach based on encouraging patients to make behavioral changes informed by an evolutionary conceptualization of depression. However, there are a few techniques that TLC has in common with CT. For example, TLC's approach to stopping rumination is based to a large extent on behavioral activation, and such behavioral components are included in the CT protocol (Beck et al., 1979). However, the behavioral activation strategies of TLC address the *process* of negative or ruminative thinking, whereas CT maintains a primary focus on the *content* of the rumination. Likewise, TLC's strategies of combating the corrosive effect of the modern environment on self-esteem, while discussed in the context of social support, is

reminiscent of CT's targeting of dysfunctional assumptions concerning self-worth (Beck, Rush, Shaw, & Emery, 1979). Nevertheless, TLC is primarily a behavioral therapy that, unlike CT, explicitly integrates several biological approaches to depression intervention (e.g., Omega-3 supplements, exercise, light exposure).

With only 12 sessions to cover a great deal of material, TLC therapists are explicitly instructed to avoid cognitive or psychodynamic techniques whenever possible. For example, whenever TLC patients initiate discussion of a dysfunctional thought, therapists focus on ways of preventing rumination on the thought and encourage the expression of social support from other group members, followed by a return to the scheduled topic for that day's session. For the most part, TLC sessions are highly structured, and therapists instruct patients to stay focused on implementing lifestyle changes. The biweekly phone calls, on the other hand, are much less structured. Therapists were instructed to keep the phone calls under 15 minutes long whenever possible, but there were occasional instances when patients' needs resulted in phone calls lasting as long as 30-45 minutes. During such calls, therapists reported using a variety of different techniques—including the occasional challenging of negatively biased cognitions—to handle the individual issues patients brought up.

Directions for future research

Data from the present investigation are preliminary in nature. Although promising, they require replication with a larger, more diverse sample, and there are a number of other important questions to be answered. In order to determine TLC's efficacy in comparison with existing treatments for depression, a clinical trial with TLC, traditional psychotherapy, antidepressant medication, and a placebo control group would be required.

A second critical issue for future examination is that of relapse. Thus far, antidepressant medications have not typically evidenced great success in preventing relapse

after treatment termination. Compared with medication, CT has been shown to be somewhat more successful: within a year of withdrawing treatment, only 30% of patients treated with CT had a relapse or recurrence in a recent large-scale study, compared with 76% of patients treated with antidepressants (Hollon et al., 2005). However, regardless of which treatment is used, the lifetime risk of recurrence following successful acute treatment for MDD is estimated to be as high as 85% (Mueller et al., 1999). Current TLC patients are being assessed 3 months and 6 months after treatment termination in order to determine their level of depressive symptoms, their remission status, and the degree to which they have adhered to the major lifestyle changes. Because of the initial success reported in preventing relapse with exercise (Singh et al., 1997), and the correlational studies that point to a prophylactic antidepressant effect for omega-3s (Hibbeln, 1999), good sleep habits (Cole & Dendukuri, 2003), and social support (George, 1989), TLC would appear to hold promise in effectively preventing future recurrence of MDD.

The mechanisms responsible for the reduction in depressive symptoms in TLC are unknown. Each element of TLC has been studied previously and shown to have antidepressant efficacy. Thus, it is not clear which of the six primary targeted lifestyle changes have the greatest antidepressant effect, or whether the same magnitude of antidepressant effect could be achieved if one or more factors were to be removed. It also remains unknown whether the treatment elements have a simple, additive, antidepressant effect, whether they interact with each other in some way; likewise, it is unknown the extent to which certain patients respond differentially to specific TLC elements. It would certainly be valuable to examine the effects of the full TLC protocol compared with the effects of the treatment elements which comprise it.

It is also unknown whether the present study results could be improved upon. As the 12 sessions are coming to a close, TLC patients inevitably report that they wish the treatment could go on longer. In fact, the impetus for expanding TLC from a 10-session to a 12-session protocol was the feedback concerning the length of the program from our 5 pilot group members. TLC therapists also report that individual rates of treatment response are widely variable, and that this difference seems to largely be a reflection of the level of Axis II pathology and motivation to change. A greater number of sessions would likely be helpful for patients with underlying personality pathology, and possibly an individual therapy format would be useful as well. Perhaps TLC could be efficacious for a wider range of patients if it lasted longer and was delivered in an individual format (perhaps in a group format with an accompanying individual therapy component much like DBT).

Although the TLC protocol was designed explicitly for the treatment of depression, it would appear to be reasonable to examine the extent to which it may be useful as well in the treatment of other forms of psychopathology. For instance, exercise has shown promise as an intervention for anxiety disorders (Morgan, 1997). Omega-3s have demonstrated efficacy in treating bipolar disorder and schizophrenia (Pomerantz, 2001), and anecdotally, TLC patients report that omega-3s have a “calming” effect on them. Given the extent to which depression and anxiety covary, the TLC protocol may be amenable to being adapted for use with some anxiety disorders. Additionally, it is possible that TLC could be adapted for use as a purely prophylactic intervention. For instance, many of these lifestyle elements could be incorporated into an intervention in a school or prison system with at-risk (but currently non-depressed) populations.

As a novel treatment for depression predicated on the idea that the higher rates of MDD today are a result of a mismatch between the modern environment and the environment

humans are best adapted for, TLC involves making a set of specific lifestyle changes. Each of these lifestyle elements has been independently demonstrated to protect against the onset of MDD and/or be efficacious in treating current MDD. In this preliminary study of TLC, patients in the active treatment group demonstrated superior reductions in depressive symptoms compared with a waitlist control group, and their outcomes compared favorably with other studies of antidepressant medication and psychotherapy. This suggests that TLC may be a viable alternative to existing treatments for depression, especially for patients who have already failed to benefit from a course of medication or psychotherapy.

References

- Adams, P. B., Lawson, S., Sanigorski, A., & Sinclair, A. J. (1996). Arachidonic acid to eicosapentaenoic acid ratio in blood correlates positively with clinical symptoms of depression. *Lipids, 31*, S157-S161.
- American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. text revision). Washington, DC: Author.
- Armitage, R. (2000). The effects of antidepressants on sleep in patients with depression. *Canadian Journal of Psychiatry, 45*, 803-809.
- Babiyak, M. A., Blumenthal, J. A., Herman, S., Khatri, P., Doraiswamy, M., Moore, K. et al. (2001). Exercise treatment for major depression: maintenance of therapeutic benefit at 10 months. *Psychosomatic Medicine, 62*, 633-638.
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy of depression*. New York: Guilford Press.
- Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77-100.
- Beck, A.T., Steer, R.A. & Brown, G.K. (1996). *Beck Depression Inventory-II Manual*. San Antonio, TX: The Psychological Corporation-Harcourt Brace & Company.
- Beeber, L. S. (1999). Testing an explanatory model of the development of depressive symptoms in young women during a life transition. *Journal of American College Health, 47*, 227-235.

- Ben Porath, D. D. (2002). Stigmatization of individuals who receive psychotherapy: An interaction between help-seeking behavior and the presence of depression. *Journal of Social and Clinical Psychology, 21*, 400-413.
- Bernstein, M., Rothstein, H., Cohen, J., Schoenfeld, D., Berlin, J., & SPSS. (2000). *SamplePower 2.0*. SPSS.
- Blumenthal, J. A., Babyak, M. A., Moore, K. A., Craighead, W. E., Herman, S., Khatri, P. et al. (1996). Effects of exercise training on older patients with major depression. *Archives of Internal Medicine, 159*, 2349-2356.
- Bowlby, J. (1969). *Attachment and loss*. London: Hogarth Press.
- Breslau, N., Roth, T., Rosenthal, L., & Andreski, P. (1996). Sleep disturbance and psychiatric disorders: a longitudinal epidemiological study of young adults. *Biological Psychiatry, 39*, 411-418.
- Brody, H. (2001). *The Other Side Of Eden: hunter-gatherers, farmers and the shaping of the world*. New York: North Point Press
- Brosse, A. L., Sheets, E. S., Lett, H. S., & Blumenthal, J. A. (2002). Exercise and the treatment of clinical depression in adults: Recent findings and future directions. *Sports Medicine, 32*, 741-760.
- Brownson, R. C., Boehmer, T. K., & Luke, D. A. (2004). Declining rates of physical activity in the United States: What are the contributors? *Annual Review of Public Health, 26*, 421-443.
- Centers for Disease Control and Prevention. (2003). National center for health statistics: Faststats. [Online]. Retrieved October 1, 2005 from <http://www.cdc.gov/nchs/fastats/exercise.htm>.
- Chagnon, N. (1992). *Yanomamo: The last days of Eden*. Orlando, Fla: Harvest Books.

- Cohen, S. (2004). Social relationships and health. *American Psychologist*, *59*, 676-684.
- Cohen, L., McGowan, J., Fooskas, S., & Rose, S. (1984). Positive life events and social support and the relationship between life stress and psychological disorder. *American Journal of Community Psychology*, *12*, 567-587.
- Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. (1985). Measuring the functional components of social support. In I. G. Sarason & B. R. Sarason (Eds.), *Social support: Theory, research and application* (pp. 73–94). The Hague, Holland: Martinus Nijhoff.
- Cole, M. G., & Dendukuri, N. (2003). Risk factors for depression among elderly community subjects: A systematic review and meta-analysis. *American Journal of Psychiatry*, *160*, 1147-1156.
- Cosmides, L., & Tooby, J. (1999). Toward an evolutionary taxonomy of treatable conditions. *Journal of Abnormal Psychology*, *108*, 453-464.
- de Mello M. F., de Jesus Mari J., Bacaltchuk J., Verdelli H., & Neugebauer R. (2005). A systematic review of research findings on the efficacy of interpersonal therapy for depressive disorders. *European Archives of Psychiatry and Clinical Neuroscience*, *255*, 75-82
- Deacon, H. J. (1999). *Human Beginnings in South Africa: Uncovering the Secrets of the Stone Age: Uncovering the Secrets of the Stone Age*. Walnut Creek, CA: AltaMira Press.
- DeRubeis, R. J., Gelfand, L. A., Tang, T. Z., & Simons, A. D. (1999). Medications versus cognitive behavior therapy for severely depressed outpatients: Mega-analysis of four randomized comparisons. *American Journal of Psychiatry*, *156*, 1007-1013.

- DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Saloman, R. M. et al. (2005). Cognitive Therapy vs Medications in the Treatment of Moderate to Severe Depression. *Archives of General Psychiatry*, 62, 409-416.
- Desjarlais, R., Eisenberg, L., Good, B., & Kleinman, A. (1995). *World mental health: Problems and priorities in low-income countries*. New York: Oxford University Press.
- Dimidjian, S., Hollon, S. D., Dobson, K. S., Schmaling, K. B., Kohlenberg, R. J., Addis, M. E., et al. (2006). Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. *Journal of Consulting and Clinical Psychology*, in press.
- Dishman, R. K. (1997). Brain monoamines, exercise, and behavioral stress: Animal models. *Medicine and Science in Sports and Exercise*, 29, 63-74.
- Doyne, E. J., Ossip-Klein, D. G., Bowman, E. D., Osborn, K. M., McDougall-Wilson, I. B., & Neimayer, R. A. (1987). Running versus weightlifting in the treatment of depression. *Journal of Consulting and Clinical Psychology*, 5, 748-754.
- Dunn, A. L., Trivedi, M. H., Kampert, J. B., Clark, C. G., & Chambliss, H. O. (2005). Exercise treatment for depression: Efficacy and dose response. *American Journal of Preventive Medicine*, 28, 1-8.
- Eaton, M. D., & Konner, M. (1985). Paleolithic nutrition: A consideration of its nature and current implications. *New England Journal of Medicine*, 312, 283-289.
- Edwards, R., Peet, M., Shay, J., & Horrobin, D. (1998). Omega-3 polyunsaturated fatty acid levels in the diet and in red blood cell membranes of depressed patients. *Journal of Affective Disorders*, 48, 149-155.

- Egeland, J. A., & Hostetter, A. M. (1983). Study: 1, Affective disorders among the Amish, 1976-1980. *American Journal of Psychiatry*, *140*, 56-61.
- Elkin, I., Shea, T., Watkins, J. T., Imber, S. D., Sotsky, S. M., Collins, J. F., et al. (1989). National Institute of Mental Health Treatment of Depression Collaborative Research Program. *Archives of General Psychiatry*, *46*, 971-982.
- Espiritu, R. C., Kripke, D. F., Anconi-Israel, S., Mowen, M. A., Mason, W. J., Fell, R. L. et al. (1994). Low illumination experienced by San Diego adults: Association with atypical depressive symptoms. *Biological Psychiatry*, *35*, 403-407.
- Ezquiaga, E., Garcia, A., Pallares, T., & Bravo, M. F. (1999). Psychosocial predictors of outcome in major depression: A prospective 12-month study. *Journal of Affective Disorders*, *52*, 209-216.
- Feder, R. (2001). Clinical depression is a disease state, not an adaptation. *Archives of General Psychiatry*, *58*, 1084.
- Fennell, M. J. V., & Teasdale, J. D. (1984). Effects of distraction on thinking and affect in depressed patients. *British Journal of Clinical Psychology*, *23*, 65-66.
- First, M. B., & Gibbon, M. (1996). SCID-101 for DSM-IV training video for DSM-IV Axis I disorders – Patient Edition (SCID-I/P, Version 2.0). New York: Biometrics Research Department, New York State Psychiatric Institute.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (1997). *User's Guide for the Structured clinical interview for Axis I DSM-IV disorders*. Washington, DC: American Psychiatric Press.
- Freedman, D. X. (1984). Psychiatric epidemiology counts. *Archives of General Psychiatry*, *41*, 931-933.

- Freeman, M. P., Hibbeln, J. R., Wisner, K. L., Brumbach, B. H., Watchman, M., & Gelenberg, A. J. (2006). Randomized dose-ranging pilot trial of omega-3 fatty acids for postpartum depression. *Acta Psychiatrica Scandinavica*, *113*, 31-35.
- Fremont, J. C., & Craighead, L. W. (1987). Aerobic exercise and cognitive therapy in the treatment of dysphoric moods. *Cognitive Therapy Research*, *11*, 241-251.
- George, L. K. (1989). Stress, social support, and depression over the life course. In K. Markides & C. Cooper (Eds.), *Aging, stress, social support, and health*. London: Wiley, 241-267.
- Gibbons, F. X., Smith, T. W., Ingram, R. E., Pearce, K., Brehm, S. S., & Schroeder, D. (1985). Self-awareness and self-confrontation: Effects of self-focused attention on members of a clinical population. *Journal of Personality and Social Psychology*, *48*, 662-675.
- Greist, J. I. I., Klein, M. H., Eischens, R. R., Faris, J., Gurman, A. S., & Morgan, W. P. (1979). Running as treatment for depression. *Comprehensive Psychiatry*, *20*, 41-54.
- Grosscup, S. J., & Lewinsohn, P. M. (1980). Unpleasant and pleasant events, and mood. *Journal of Clinical Psychology*, *36*, 252-259.
- Hagen, E. H. (2003). The bargaining model of depression. In P. Hammerstein (Ed.), *Genetic and cultural evolution of cooperation*. The MIT Press (pp. 95-123).
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurological and Neurosurgical Psychiatry*, *23*, 56-62.
- Hibbeln, J. R. (1999). Long-chain polyunsaturated fatty acids in depression and related conditions. In: M. Peet, I. Glen, & D. F. Horrobin (Eds.), *Phospholipid Spectrum Disorder in Psychiatry* (pp. 195-210). Marius Press: Carnforth, England.

- Hohagen, F., Rink, K., Kappler, C., & Schramm, E. (1993). Prevalence and treatment of insomnia in general practice: A longitudinal study. *European Archives of Psychiatry and Clinical Neuroscience*, *242*, 329-336.
- Hollan, D. W. (1992) Emotion, work and value of emotional equanimity among the Toraja. *Ethnology*, *31*, 45-56.
- Hollon, S. D., Thase, M. E., & Markowitz, J. C. (2002). Treatment and prevention of depression. *Psychological Science in the Public Interest*, *3*, 39-72.
- Hollon, S. D., DeRubeis, R. J., Evans, M. D., Wiemer, M. J., Garvey, M. J., Grove, W. M., & Tuason, V. B. (1992). Cognitive therapy and pharmacotherapy for depression: Singly and in combination. *Archives of General Psychiatry*, *49*, 774-781.
- Hollon, S. D., DeRubeis, R. J., Shelton, R. C., Amsterdam, J. D., Saloman, R. M., O'Reardon, J. P. et al. (2005). Prevention of relapse following cognitive therapy vs. medications in moderate to severe depression. *Archives of General Psychiatry*, *62*, 417-422.
- Hollon, S. D., Jarrett, R. B., Nierenberg, A. A., Thase, M. E., Trivedi, M., & Rush, A. J. (2005). Psychotherapy and medication in the treatment of adult and geriatric depression: which monotherapy or combined treatment? *Journal of Clinical Psychiatry*, *66*, 455-468.
- Horrobin, D. F. (2001). Phospholipid metabolism and depression: The possible roles of phospholipase A-sub-2 and coenzyme A-independent transacylase. *Human psychopharmacology: Clinical and experimental*, *16*, 45-52.
- Ilardi, S.S., Karwoski, L., & Lehman, K.A. (2006). We were never designed for this: Genome-environment mismatch and the modern depression epidemic. Manuscript in preparation.

- Ingram, R. E. (1984). Toward an information-processing analysis of depression. *Cognitive Therapy and Research*, 8, 443-478.
- Jacobson, N. S., Dobson, K. S., Truax, P. A., Addis, M. E., Koerner, K., Gollan, J. K. et al. (1996). A component analysis of cognitive-behavioral treatment for depression. *Journal of Consulting and Clinical Psychology*, 64, 295-304.
- Just, N., & Alloy, L. B. (1997). The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology*, 106, 221-229.
- Katz, G., Knobler, H. Y., Laibel, Z., Strauss, Z., & Durst, R. (2002). Time zone change and major psychiatric morbidity: The results of a 6-year study in Jerusalem. *Comprehensive Psychiatry*, 43, 37-40.
- Keller, M. B., & Boland, R. J. (1998). Implications of failing to achieve successful long-term maintenance treatment of recurrent unipolar major depression. *Biological Psychiatry*, 44, 348-360.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K. R., et al. (2003). The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association*, 289, 3095-3105.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset for distributions in DSM-IV disorders in the National Comorbidity replication. *Archives of General Psychiatry*, 62, 593-602.
- Klein, M. H., Greist, J. H., Gurman, A. S., Neimayer, R. A., Lesser, D. P., Bushnell, N. J., et al. (1985). A comparative outcome study of group psychotherapy vs. exercise treatments for depression. *International Journal of Mental Health*, 13, 148-176.

- Klerman, G. L., Lavori, P. W., Rice, J. Reich, T., Endicott, J., Andreasen, N. C., et al. (1985). Birth-cohort trends in rates of major depressive disorder among relatives of patients with affective disorder. *Archives of General Psychiatry*, 45, 689-693.
- Kripke, D. F. (1998). Light treatment for nonseasonal depression: Speed, efficacy, and combined treatment. *Journal of Affective Disorders*, 49, 109-117.
- Kuehner, C., & Bueger, C. Determinants of subjective quality of life in depressed patients: The role of self-esteem, response styles, and social support. (2005). *Journal of Affective Disorders*, 86, 205-213.
- Kuo, T., Manber, R., & Loewy, D. (2001). Insomniacs with comorbid conditions achieved comparable improvement in a cognitive-behavioral group treatment program as insomniacs without comorbid depression. *Sleep*, 14, A62.
- Lam, D., Smith, N., Checkley, S., Rijdsdijk, F., & Sham, P. (2003). Effect of neuroticism, response style and information processing on depression severity in a clinically depressed sample. *Psychological Medicine*, 33, 469-479.
- Lawlor, D. A., & Hopker, S. W. (2001). The effectiveness of exercise as an intervention in the management of depression: systematic review and meta-regression analysis of randomized controlled trials. *British Medical Journal*, 322, 763-767.
- Lavori, P. W., Warshaw, M., Klerman, G., Mueller, T. I., Leon, A., Rice, J. et al. (1993). Secular trends in lifetime onset of MDD stratified by selected sociodemographic risk factors. *Journal of Psychiatry Research*, 27, 95-109.
- Leaf, A., & Weber, P. C. (1987). A new era for science in nutrition. *American Journal of Clinical Nutrition*, 45, 1048-1053.

- Leonard, B. (2005). *More worker time spent commuting than vacationing*. [Online] Retrieved October 1, 2005 from http://www.shrm.org/hrnews_published/archives/CMS_012160.asp
- Lin, N., Dean, A., & Ensel, W. (1986). *Social Support, Life Events, and Depression*. Orlando, Florida: Academic.
- Linehan, M. M. (1993). *Skills training manual for treating borderline personality disorder*. New York: The Guilford Press.
- Longley, A. J. (2001). Depression is an adaptation. *Archives of General Psychiatry*, 58, 1083.
- Lustman, P. J., Freedland, K. E., Griffith, L. S., & Clouse, R. E. (1998). Predicting response to cognitive behavior therapy of depression in type 2 diabetes. *General Hospital Psychiatry*, 20, 302-306.
- Lydiard, R. B. (1991). Coexisting depression and anxiety: Special diagnosis and treatment issues. *Journal of Clinical Psychiatry*, 52, 48-54.
- Lyubomirsky, S., & Nolen-Hoeksema, S. (1993). Self-perpetuating properties of dysphoric rumination. *Journal of Personality and Social Psychology*, 65, 339-349.
- Martell, C. R., Addis, M. E., & Jacobson, N. S. (2001). *Depression in context: Strategies for guided action*. New York: W. W. Norton.
- Martinsen, E. W., Hoffart, A., & Sohlberg, O. (1989). Comparing aerobic with nonaerobic forms of exercise in the treatment of clinical depression: A randomized trial. *Comprehensive Psychiatry*, 30, 324-331.
- Martinsen, E. W., Medhus, A., & Sandvik, L. (1985). Effects of aerobic exercise on depression: A controlled study. *British Medical Journal*, 291, 109.

- Martiny, K., Lunde, M., Uden, M., Dam, H., & Bech, P. (2005). Adjunctive bright light in non-seasonal depression: results from clinician-related scales. *Acta Psychiatrica Scandinavica*, *112*, 117-125.
- Mather, A. S., Rodriguez, C. Guthrie, M. F., McHarg, A. M., Reid, I. C., & McMurdo, M. E. T. (2002). Effects of exercise on depressive symptoms in older adults with poorly responsive depressive disorder: Randomized controlled trial. *British Journal of Psychiatry*, *180*, 411-415.
- McIntyre, I. M., Norman, T. R., Burrows, G. D., & Armstrong, S. M. (1989). Human melatonin suppression by light is intensity dependent. *Journal of Pineal Research*, *6*, 149-156.
- McCann, I. L., & Holmes, D. S. Influence of aerobic exercise on depression. (1984). *Journal of Personality and Social Psychology*, *46*, 1142-1147.
- McNeil, J. K., LeBlanc, E. M., & Joyner, M. (1991). The effect of exercise on depressive symptoms in the moderately depressed elderly. *Psychology and Aging*, *6*, 487-488.
- Molnar, P. (2005). Tracing prehistoric activities: Musculoskeletal stress marker analysis of a stone-age population on the Island of Gotland in the Baltic sea. *Journal of Physical Anthropology*, Online pre-print, Retrieved October 1, 2005, from <http://www3.interscience.wiley.com/cgi-bin/abstract/112092550/ABSTRACT>.
- Morawetz, D. (2003). Insomnia and depression: Which comes first? *Sleep Research Online*, *5*, 77-81.
- Morgan, W. P. (1997). *Physical activity and mental health*. Washington, DC: Taylor & Francis.

- Morrow, J., & Nolen-Hoeksema, S. (1990). Effects of responses to depression on the remediation of depressive affect. *Journal of Personality and Social Psychology*, 58, 519–527.
- Mueller, T. I., Leon, A. C., Keller, M. B., Solomon, D. A., Endicott, J., Coryell, W. et al. (1999). Recurrence after recovery from major depressive disorder during 15 years of observational follow-up. *American Journal of Psychiatry*, 156, 1000-1006.
- Murphy, G. E., Simons, A. D., Wetzel, R. D., & Lustman, P. J. (1984). Cognitive therapy and pharmacotherapy: Singly and together in the treatment of depression. *Archives of General Psychiatry*, 41, 33-41.
- National Institute of Mental Health (NIMH). (1999). The numbers count (NIH Publication No. NIH 99-4584) [Online]. Retrieved August 1, 2005, from <http://www.NIMH.NIH.gov/publicat/numbers.CFM>
- National Sleep Foundation. (2002). 2002 “Sleep in America” Poll. [Online]. Retrieved October 1, 2005 from http://www.sleepfoundation.org/_content/hottopics/2002SleepInAmericaPoll.pdf
- Nemets, B., Stahl, Z., & Belmaker, R. H. (2002). Addition of omega-3 fatty acid to maintenance medication treatment for recurrent unipolar depressive disorder. *American Journal of Psychiatry*, 159, 477-479.
- Nesse, R. (1999). What Darwinian medicine offers psychiatry. In W. R. Trevathan, E. O. Smith, & J. J. McKenna (Eds.), *Evolutionary medicine*. Oxford: Oxford University Press. (p. 351-373).
- Nesse, R. (2001). Is depression an adaptation? *Archives of General Psychiatry*, 57, 14-20.
- Neuhaus, I. M., & Rosenthal, N. E. (1997). Light therapy as a treatment modality for affective disorders. In A. Honig & H. M. van Praag (Eds.), *Depression:*

- Neurobiological, psychopathological and therapeutic advances*. p. 591-605. New York: John Wiley & Sons Ltd.
- Nierenberg, A. A., Alpert, J. E., Pava, K. A., Worthington, J. J. III, Rosenbaum, J. F., & Fava, M. (1999). Residual symptoms in depressed patients who respond acutely to fluoxetine. *Journal of Clinical Psychiatry*, *60*, 221-225.
- Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of the depressive episode. *Journal of Abnormal Psychology*, *100*, 569-582.
- Nolen-Hoeksema, S., & Morrow, J. (1991). A prospective study of depression and distress following a natural disaster: The 1989 Loma Prieta earthquake. *Journal of Personality and Social Psychology*, *61*, 105-121.
- Nolen-Hoeksema, S., & Morrow, J. (1993). The effects of rumination and distraction on naturally-occurring depressed moods. *Cognition and Emotion*, *7*, 561-570.
- North, T. C., McCullagh, P., & Tran, V. T. (1990). Effect of exercise on depression. *Exercise and Sport Sciences Reviews*, *18*, 379-415.
- O'Neal, H. A., Dunn, A. L., & Martinsen, E. W. (2000). Depression and exercise. *International Journal of Sports Psychology*, *31*, 110-135.
- Oxman, T. E., Berkman, L. F., Kasl, S.V., Freeman, D. H., & Barrett, J. (1992). Social support and depressive symptoms in the elderly. *American Journal of Epidemiology*, *135*, 356-368.
- Pate R. R., Pratt M., Blair S. N., Haskell, W. L., Macera, C. A., Bouchard, C. et al. (1995). Physical activity and public health: a recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Journal of the American Medical Association*, *273*, 402-407.

- Peet, M., & Horrobin, D. F. (2002). A dose-ranging study of the effects of ethyl-eicosapentaenoate in patients with ongoing depression despite treatment with apparently adequate treatment with standard drugs. *Archives of General Psychiatry*, *59*, 913-919.
- Penninx, B. W., Rejeski, W. J., Pandya, J., Miller, M. E., Di Bari, M., Applegate, W. B., et al. (2002). Exercise and depressive symptoms: a comparison of aerobic and resistance exercise effects on emotional and physical function in older persons with high and low depressive symptomatology. *The Journals of Gerontology, Series B, Psychological Sciences and Social Sciences*, *57*, 124-132.
- Perlis, M. L., Smith, L. J., Lyness, J. M., Matteson, S. R., Pigeon, W. R., Jungquist, C. R., et al. (2006). Insomnia as a Risk Factor for Onset of Depression in the Elderly. *Journal of Behavioral Sleep Medicine*, *4*, 104-113.
- Pigeon, W. R., Hegel, M., Phillips, C., Lyness, J. M., Unützer, J., Sateia, M. J., et al. (2005). *Insomnia as a Perpetuating Factor in Late-Life Major Depression: The IMPACT Cohort. Paper presented at the Annual Meeting of the Associated Professional Sleep Societies (APSS) in Denver.*
- Pomerantz, J. M. (2001). Omega-3 fatty acids and mental health. *Drug Benefit Trends*, *13*, 2-3.
- Prasko, J., Horacek, J., Klaschka, J., Kosova, J., Ondrackova, I., & Sipek, J. (2002). Bright light therapy and/or imipramine for inpatients with recurrent non-seasonal depression. *Neuro Endocrinology Letters*, *23*, 109-113.
- Price, J., Sloman, L., Gardner, R., Gilbert, P., & Rohde, P. (1994) The social competition hypothesis of depression. *British Journal of Psychiatry*, *164*, 309-315.

- Prince, R. (1967). The changing picture of depressive symptoms in Africa: Is it fact or diagnostic fashion? *Canadian Journal of African Studies*, 1, 177-192.
- Putnam, R. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Rabkin, J. G., & Klein, D. F. (1987). The clinical measurement of depressive disorders. In A. Marsella, R. Hirschfeld, & M. Katz (Eds.), *The measurement of depression* (pp. 30-83). New York: Guilford Press.
- Rosenthal, N. E. (1993). Diagnosis and treatment of seasonal affective disorder. *Journal of the American Medical Association*, 270, 2717-2720.
- Ross, C. E. & Hayes, D. (1988). Exercise and psychologic well-being in the community. *American Journal of Epidemiology*, 127, 762-771.
- Schieffelin, E. L. (1985). The cultural analysis of depressive affect: An example from Papua New Guinea. In A. M. Kleinman & B. Good (Eds.), *Culture and Depression* (pp. 101-133). Berkeley: University of California Press.
- Schumaker, J. G. (1996). Understanding psychopathology: Lessons from the developing world. In S. C. Carr & J. G. Schumaker (Eds.), *Psychology and the developing world* (pp. 180-190). Westport, Connecticut: Praeger Publishers.
- Seeman, T. E. (1996). Social ties and health: The benefits of social integration. *Annals of Epidemiology*, 6, 442-451.
- Segal, D. L., Hersen, M., & Van Hasselt, V. B. (1994). Reliability of the Structured Clinical Interview for DSM-III-R: An evaluative review. *Comprehensive Psychiatry*, 35, 316-327.
- Seligman, M. P. (1988). Boomer blues: with too great expectations, the baby-boomers are sliding into individualistic melancholy. *Psychology Today*, 16, [Online]. Retrieved

October 1, 2005 from

http://www.findarticles.com/p/articles/mi_m1175/is_n10_v22/ai_6652858

- Seligman, M. E. P. (1990). Why is there so much depression? The waxing of the individual and the waning of the commons. In R. E. Ingram (Ed.), *Contemporary psychological approaches to depression* (pp. 1-9). New York: Plenum Press.
- Silvers, K. M., Woolley, C. C., Hamilton, F. C., Watts, P. M., & Watson, R. A. (2005). Randomized double-blind placebo-controlled trial of fish oil in the treatment of depression. *Prostaglandins, Leukotrienes, and Essential Fatty Acids*, *72*, 211-218.
- Singh, N. A., Clements, K. M., & Fiatarone, M. A. (1997). A randomized controlled trial of progressive resistance training in depressed elders. *Journals of Gerontology*, *52*, M27-M35.
- Singh, N. A., Clements, K. M., & Singh, M. A. (2001). The efficacy of exercise as a long-term antidepressant in elderly subjects: A randomized, controlled trial. *Journal of Gerontology*, *56*, 497-504.
- Sirey, J. A., Bruce, M. L., Alexopoulos, G. S., Perlick, D. A., Friedman, S. J., & Meyers, B. S. (2001). Stigma as a barrier to recovery: Perceived stigma and patient-rated severity of illness as predictors of antidepressant drug adherence. *Psychiatric Services*, *52*, 1615-1620.
- Smith, M. T., Perlis, M. L., Park, A., Smith, M. S., Pennington, J., Giles, D. E., et al. (2002). Comparative meta-analysis of pharmacotherapy and behavior therapy for persistent insomnia. *American Journal of Psychiatry*, *159*, 5-11.
- Spielmann, K. A., & Eder, J. F. (1994). Hunters and farmers: Then and now. *Annual Review of Anthropology*, *23*, 303-323.

- Stephens, T. (1988). Physical activity and mental health in the United States and Canada: Evidence from four population surveys. *Preventive Medicine, 17*, 35-47.
- Su, K., Huang, S., Chiu, C., & Shen, W. W. (2003). Omega-3 fatty acids in major depressive disorder: A preliminary double-blind, placebo-controlled trial. *European Neuropsychopharmacology, 13*, 267-271.
- Teasdale, J. D. (1983). Negative thinking in depression: Cause, effect, or reciprocal relationship. *Advances in Behavior Research and Therapy, 5,1*, 3-25.
- Tooby, J. & Cosmides, L. (1990). On the universality of human nature and the uniqueness of the individual: The role of genetics and adaptation. *Journal of Personality, 58*, 17-67.
- Tooby, J. & Cosmides, L. (2002). Toward mapping the evolved functional organization of mind and brain. In D. J. Levitin (Ed.), *Foundations of cognitive psychology: Core readings* (pp. 665-681). Cambridge, MA: MIT Press.
- Trivedi, M. H., Rush, A. J., Wisniewski, S. R., Nierenberg, A. A., Warden, D., Ritz, L., et al. (2006). Evaluation of Outcomes With Citalopram for Depression Using Measurement-Based Care in STAR*D: Implications for Clinical Practice. *American Journal of Psychiatry, 163*, 28-40.
- Tuunainen, A., Kripke, D. F., & Endo, T. (2004). Light therapy for non-seasonal depression. *Cochrane Database System Review, 2*, CD004050.
- van den Broek, W. W., de-Lely, A., Mulder, P. G. H., Birkenhager, T. K., & Bruijn, J. A. (2004). Effect of Antidepressant Medication Resistance on Short-term Response to Electroconvulsive Therapy. *Journal of Clinical Psychopharmacology, 24*, 400-403.
- Veale, D., Le Fevre, K., Pantelis, C., de Souza, V., Mann, A., & Sargeant, A. (1992). Aerobic exercise in the adjunctive treatment of depression: A randomized controlled trial. *Journal of the Royal Society of Medicine, 85*, 541-544.

- Wells, A., & Papageorgiou, C. (2004). Metacognitive therapy for rumination. In C. Papageorgiou (Ed.), *Depressive rumination: Nature, theory, and treatment* (pp. 259-273). West Sussex, England: Wiley.
- Wright, R. (1995). The evolution of despair. *Time*, *146*, 50-57.
- Yehuda, S., Rabinovitz, S. & Mostofsky, D. I. (1999). Essential fatty acids are mediators of brain biochemistry and cognitive functions. *Journal of Neuroscience Research*, *56*, 565-570.

Table 1

Randomized controlled trials of exercise and depression

Author and date	Treatment groups	Inclusion criteria	Mean age	Duration of treatment	Follow-up	Primary outcome measure + pre;post means per group	Percent remission after treatment	Drop out rate per condition	Results
Blumenthal et al., 1999, Babyak et al., 2000	1. aerobic exercise 2. medication 3. aerobic exercise and medication	N=156, 50-77, DSM IV MDD, HRS D>12	57	16 wk	6 mos.	HRSD 1. 17.5; 8 2. 18.5; 7.75 3. 18.0; 9	DSM-IV 1. 60.4 2. 68.8 3. 65.5	1. 26.4 2. 14.6 3. 20.0	Exercise= medication combination
Doyne et al., 1987	1. running 2. weightlifting 3. waitlist	N=40 women, RDC minor or major depression	28.52	8 wk	1 year	BDI 1. 22.27; 8.18 2. 22.07; 5.93 3. 20.17; 15.25	BDI<9 1. 67% 2. 80% 3. 17%	1. 40% 2. 29% 3. 13%	Aerobic = Anaerobic > Waitlist
Dunn et al., 2005	1. LD 3 days a week 2. PHD 3 days a week 3. LD 5 days a week 4. PHD 5 days a week 5. flexibility exercise	N=80, SCID MDD, HRS D > 11	35.9	12 wk	None	HRSD 1. 19.3; 11.7 2. 19.1; 9.0 3. 19.2; 12.8 4. 19.1; 10.0 5. 20.5; 14.0	HRSD<8 1. 31% 2. 31% 3. 19% 4. 55% 5. 11%	LD: 26% PHD: 30% Control: 62%	PHD > LD = Placebo
Fremont & Craighhead, 1987	1. running 2. CBT 3. running and CBT	N=54, 9<BDI<30	ran ged from 19-62.	10 wk	4 month	BDI 1. 17.0; 6.1 2. 19.0; 8.0 3. 17.7;	Not reported	Authors report dropout rates	Running= CBT= running+ CBT

						10.0		equiv alent across condit ions	
Greist et al., 1979	1. running 2. time- limited psychothe rapy 3. time- unlimited psychothe rapy	N= 28, RDC minor depre ssion	ran ged fro m 18- 30	12 wk	1 year	SCL-90 (#'s estimated from graphs) 1. 2.8; .8 3. 2.5; 1.0 3. 2.65; 2.2	Not reported	1. 20% 2. 17% 3. 25%	Running= Both psychothe rapy conditions
Klein et al., 1985	1. running 2. group therapy 3. meditation - relaxation	N= 74 patien ts, SCL- revise d>60 %, RDC minor or major depre ssion	30	12 wk	9 mos	SCL-90 1. 2.29; 1.03 2. 2.10; 1.23 3. 2.59; 0.83	Not reported	1. 44% 2. 33% 3. 52%	Running= therapy= meditation
Martin sen et al., 1985	1. aerobic exercise 2. occupatio nal therapy	N= 43,17 -60, DSM MDD	40	9 wk	None	BDI (#'s estimated from graphs) 1. 26;12 2. 31; 22	Not reported	(Num ber of partic ipants per group not report ed) 1. 4 dropo uts 2. 2 dropo uts	Aerobic exercise> occupatio nal therapy
Mather , et al., 2002	1. exercise class (mostly anaerobic) 2. health education talks	N=86 , 53 y.o. +, ICD- 10 mood disord er,	~ 65	10 wk	None	HRSD 1. 16.7; 12.6 2. 17.4; 13.7	≥ 30% reductio n in HRSD 1. 55% 2. 33%	No dropo uts	Exercise class> Health education talks

		GDS > 10							
McCan n & Holmes, 1984	1. aerobic exercise 2. muscle relaxation 3. no treatment	N= 43, Under graduates, BDI> 11	und ergr aduates	10 wk	None	BDI (#'s estimated from graphs) 1. 15.5; 3 2. 15.5; 9.5 3. 15; 12	Not reported	1. 6% 2. 7% 3. 13%	Exercise > Placebo= Waitlist
McNeil et al., 1991	1. aerobic walking 2. social contact 3. wait-list	N= 30, 12<B DI<2 4	72. 5	6 wk	None	BDI 1. 16.6; 11.1 2. 16.0; 11.8 3. 15.2; 14.7	Not reported	No dropouts	Exercise= Social contact> Wait-list control
Singh et al., 1997, Singh et al., 2001	1. progressive resistance training 2. attention-control	N= 32, 60 y.o.+, BDI> 12, DSM-IV MDD, minor depression, or dysth ymia	71. 3	20 wk	2 year follow-up	BDI 1. 21; 9.2 2. 18.28; 11.0	BDI<9 1. 73% 2. 36%	1. 18% 2. 0%	Weight-training > Control
Veale et al., 1992, Study 1	1. aerobic running and routine psychiatric care 2. routine care control	N= 83, CIS> 16 and depression severity>1	35. 5	12 wk	None	BDI 1. 22.91; 13.94 2. 26.66; 17.79	Not reported	1. 12 (25%) 2. 6 (17.2 %)	Exercise > Control

BDI= Beck Depression Inventory, CBT= cognitive behavior therapy, CIS= Clinical Interview Scale, DSM= Diagnostic and Statistical Manual of Mental Disorders, GDS= Geriatric Depression Scale, HRSD= Hamilton Rating Scale for Depression, LD= Low dose, MDD= major depressive disorder, NOS= not otherwise specified, PHD= Public health dose, RDC= Research Diagnostic Criteria, SCID= Structured Clinical Interview for Depression, SCL= Symptom Checklist

Table 2

Randomized controlled trials of Omega-3s and depression

Author and date	Daily dosage of Omega-3 PUFAs	Treatment groups	Participants	Duration of treatment	% completing treatment / total	Outcome measures	Results
Nemets, Stahl, & Belmaker (2002)	2 g EPA or placebo	10 omega-3; 10 placebo	MDD outpatients on antidepressants	4 weeks	95%	HRSD	EPA > Placebo
Peet & Horrobin (2002)	1 g, 2 g, or 4 g of EPA, or placebo	18 1 g; 17 2 g; 17 4 g; 18 placebo	> 15 HRSD, outpatients in standard treatment	12 weeks	88%	HRSD	1 g > 2 g, 4 g or placebo
Silvers et al., 2005	.6 g EPA; 2.4 g DHA or placebo	24 omega-3; 21 placebo	outpatients	12 weeks	77%	HRSD-SF; BDI	Omega-3 = Placebo
Su et al., 2003	2200 mg EPA; 1100 mg DHA or placebo	14 omega-3; 14 placebo	Taiwanese outpatients, 18-60	8 weeks	86%	21-item HRSD	Omega-3: 61% reduction in Sx Placebo: 29% reduction in Sx P=.001

Table 3

Randomized controlled trials of light therapy and depression

Author and date	Treatment groups	Inclusion criteria	Mean age	Duration of treatment	Primary outcome measure + pre;post means per group	Percent in remission after treatment	Drop out rate per condition	Results
Kripke et al., 1992	1. 3 hours evening white light (2000-3000 lux) 2. red light (50 lux)	51 inpatients, DSM-III MDD or bipolar disorder	48	7 days	HRSD; not reported	Not reported	1. 32% 2. 8%	10% responded to white light; 0% to red light
Mackert et al., 1991	1. 2 hours morning white light (2500 lux) 2. 2 hours morning red light (50 lux)	42 inpatients, RDC MDD or bipolar	54	7 days	HRSD; 1. 19.5; 15.3 2. 19.1; 17.3	50% response on HRSD: 1. 18% 2. 10%	Not reported	Bright light= placebo
Martiny et al., 2005	1. 1 hour morning light (10,000 lux) + sertraline 2. 30 minutes morning light (50 lux) + sertraline	102, DSM-IV MDD	1. 46 2. 43	5 weeks	HRSD; 1. 22.4; 9.0 2. 22.1; 11.6	50% response on HRSD: 1. 71% 2. 39%	1. 10% 2. 9%	Bright light > placebo
Prasko et al., 2002	1. bright light therapy (5000 lux from 6-8 a.m.) and imipramine 150 mg/day.	34 inpatients, DSM-III-R MDD	43	3 weeks	HRSD	50% response on HRSD: 1. 36.4% 2. 66.7% 3. 33.3	1. 15% 2. 18% 3. 10%	All groups improved equally

	2. bright light therapy (5000 lux from 6-8 a.m.) and imipramine-like placebo. 3. dim red light (500 lux from 6-8 a.m.) and imipramine 150 mg/day							
Rao et al., 1992	1. 2 hours morning white light (2500 lux) 2. 2 hours morning red light (50 lux)	50 inpatients, RDC/ ICD MDD	53	7 days	HRSD	50% response on HRSD: 1. 21% 2. 6%	Not reported	Not reported
Yamada et al., 1995	1. 2 hours morning bright light (2500 lux) 2. 2 hours morning dim light (500 lux) 3. 2 hours Evening bright light (2500 lux) 4. 2 hours Evening dim light (500 lux)	17 DSM MDD & 10 DSM bipolar	Not reported	7 days	HRSD; 1. 15.5; 9.6 2. 25.8; 23.5 3. 19.2; 12.8 4. 18.4; 16.0	Not reported	Not reported	Bright light resulted in significant improvement; dim light did not.

Table 4

Outline of Sessions in TLC group protocol

Session 1: Introduction to treatment, rationale, nutrition, rumination
Session 2: Rumination and behavioral activation
Session 3: Exercise
Session 4: Light exposure
Session 5: Social support
Session 6: Sleep hygiene
Session 7: Esteem maintenance
Session 8: Review
Session 9: Flow activities
Sessions 10-12: Review and relapse prevention

Table 5

Characteristics of participants according to group assignment

	Age, mean (SD)	Male, No. (%)	Nonwhite, No. (%)	Married, No. (%)	Education, mean (SD)	Baseline BDI, mean (SD)	Baseline HRSD, mean (SD)	In therapy at intake, No. (%)	On medication at intake, No. (%)	Number of patients with >2 previous MDD episodes
Group (n=31)	39.3 (14.0)	12 (38.7)	3 (9.7)	11 (34.4)	16 (2.1)	30.5 (6.1)	19.1 (6.02)	11 (35.4)	12 (38.7)	19 ^a (61.3)
Wait list (n=12)	35.3 (14.0)	6 (50)	1 (8.333)	2 (16.666)	15 (1.4)	27.8 (6.02)	19.9 (6.8)	5 (42)	7 (58)	9 (75)
Total (n=43)	38.2 (14.0)	18 (41.9)	4 (9.3)	13 (30.2)	15 (2)	29.8 (6.1)	19.4 (6.2)	16 (37.2)	19 (44.2)	28 (65.1)

^a Data on this variable was missing for 6 patients in the TLC treatment group. Thus, we do not have information on the number of previous episodes for 19.4% of these patients. Five (16.1%) had had one or two previous depressive episodes.

Table 6

Adherence to TLC Elements

	Sleep % (SD)	Bright Light% (SD)	Exercise % (SD)	Omega-3 & Multivitam in % (SD)	Pleasant Activities % (SD)	Social Self- support % (SD)
Degree of compliance	79.8 (12.8)	65.9 (28.5)	70.6 (40.3)	94.5 (16)	72.1 (27.5)	70.1 (34.3)

Table 7

Average Baseline and Termination BDI & HRSD Scores

Completer 31 Patients

	TLC		Waitlist	
	N	Mean ± SD	N	Mean ± SD
BDI				
Baseline	22	31.7 ± 5.5	9	27.6 ± 6.9
Termination	22	9.5 ± 8.5	9	19.1 ± 11.8
HRSD				
Baseline	22	19.9 ± 6.6	9	17.9 ± 12.3
Termination	22	9.0 ± 6.9	9	12.3 ± 6.9

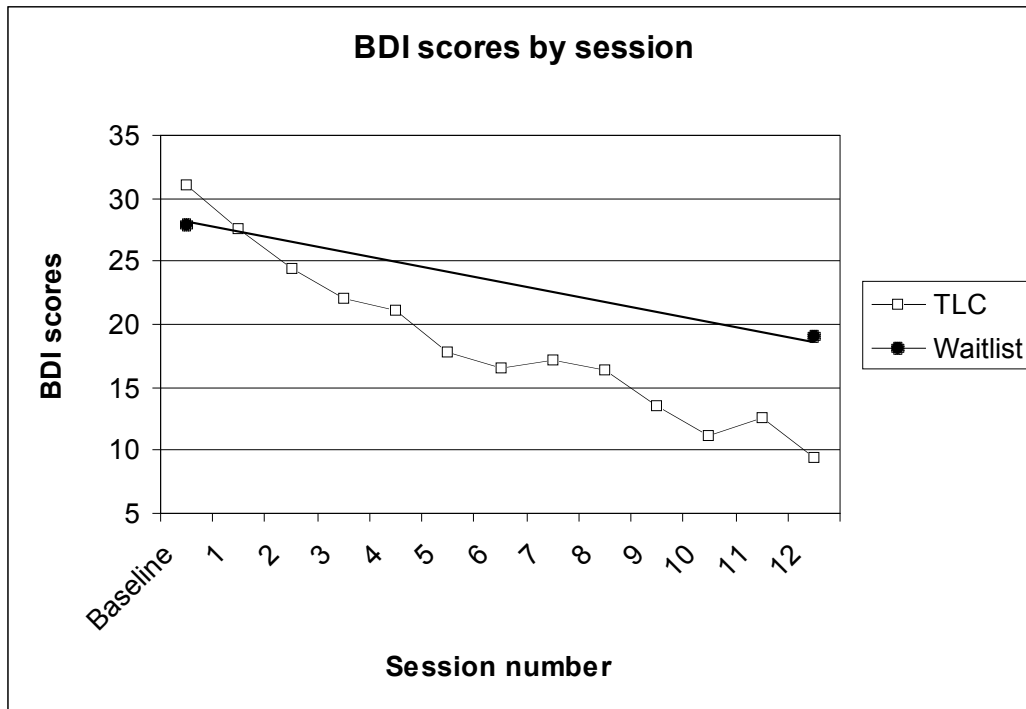
Intent to Treat 43 Patients

	TLC		Waitlist	
	N	Mean ± SD	N	Mean ± SD
BDI				
Baseline	30	30.4 ± 6.2	12	27.8 ± 6.02
Termination	30	11.9 ± 7.9	12	21.5 ± 11.0
HRSD				
Baseline	30	19.9 ± 6.1	12	19.9 ± 6.8
Termination	30	11.9 ± 7.9	12	15.8 ± 9.4

Table 8

	Adjuvant Medication		No adjuvant medication	
	N	Mean \pm SD	N	Mean \pm SD
BDI				
Baseline	9	30.0 \pm 5.7	13	32.7 \pm 5.2
Termination	9	8.0 \pm 6.8	13	10.6 \pm 9.6
HRSD				
Baseline	9	21.0 \pm 6.0	13	19.2 \pm 7.2
Termination	9	8.0 \pm 6.4	13	8.0 \pm 7.0

Figure 1



Appendix A

<p>How to fill out the Record Form:</p> <p>Each day, beginning after the first time each activity or therapy is introduced in a Lifestyle Change session, record in that day's box the information requested for each item. For the "Supplement & Multivitamin?" prompt, circle the letter indicating whether or not you took the omega-3 fish oil supplement and multivitamin for that day. For the "Bright Light" prompt, record the amount of time you spent under exposure to bright light. For the "Exercise" prompt, record the amount of time spent exercising that day, as well your pulse immediately after ending the exercise activity. For the "Pleasant Activity?" prompt, record whether or not you participated in a pleasant activity to prevent you from ruminating, as was discussed in the first session. For the "Hours of Sleep" prompt, record the estimated number of hours of sleep obtained the previous night (excluding the time you spent in bed but not sleeping). For the "Daily Mood Rating" prompt, record the overall impression of your average mood over the day on a scale from 1 to 10, with 10 representing the best mood you can imagine on average all day and with 1 representing the worst mood you can imagine on average all day. For the "3 Things" prompt, write 3 things that you can give yourself credit for each day. Feel free to write more below this entry on any other mood-related subject for that day.</p> <p>The box to the right serves as an example for someone completing her record for March 17th. This individual has reported taking her supplement, using the light box from 9 a.m. to 10 a.m., running for half an hour (at a fairly rapid pace, reaching an pulse of 160, indicating an aerobic pace), participating in a pleasant anti-rumination activity, getting approximately seven hours of actual sleep the previous night, an average daily mood slightly better than neutral, and three things she can give herself credit for. Thank you for taking the time to complete this!</p>						<p>Mar. 17</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y <input checked="" type="radio"/> N • Bright Light Time: 9:00-10:00 a.m. • Exercise Time: 30 minutes Pulse: 160 • Pleasant Activity? <input checked="" type="radio"/> • Hours of Sleep: 7 • Daily Mood Rating: 6 <p>• 3 Things: 1. Went to the gym even though I didn't feel like it. 2. Complimented my friend and made her feel good. 3. Wrote in my journal.</p>
Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday
<p>June 14</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 15</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 16</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 17</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 18</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 19</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things: 	<p>June 20</p> <ul style="list-style-type: none"> • Supplement & Multivitamin? Y N • Bright Light Time: • Exercise Time: Pulse: • Pleasant Activity? Y N • Hours of Sleep: • Daily Mood Rating: • 3 Things:

Appendix B

Therapeutic Lifestyle Change for Depression
12-week protocol

July 7, 2005

by Stephen Ilardi, Leslie Karwoski, Kenneth A. Lehman, April Minatrea, Jennifer Prohaska, Dana Steidtmann, Brian A. Stites & Jennifer Wurtz
www.psych.ku.edu/TLC

University of Kansas

Notes for Therapists

Session 1:

- I. Introduction to treatment
- II. Rationale behind TLC-D
- III. Nutrition
- IV. Rumination

Session 2:

- I. Anti-rumination strategies
- II. Behavioral Activation

Session 3:

- I. Exercise

Session 4:

- I. Light Exposure

Session 5:

- I. Social Support

Session 6:

- I. Sleep Hygiene

Session 7:

- I. Esteem Maintenance

Session 8:

- I. Review and Troubleshooting

Session 9:

- I. Flow

Session 10:

- I. Relapse Prevention

Session 11:

- I. Review

Session 12: (HRSD)

- I. Review/Relapse Prevention

Notes for Therapists

Things that therapists need to provide at every session:

(It would make sense for one co-therapist to take tasks #1-7, since they are all related to worksheets and room set-up, and for the other to take tasks #8-9, since both require doing things outside of the night of group, ie. contacting HRSD screeners and checking out/returning the videocamera)

1. A clean space, organized to accommodate all the participants. Make sure there are enough chairs, that any chalkboards are erased, that there are tissues available on the table, no old newspapers on the floor, etc.
2. At the first session, each participant should be handed a 3-ring binder that they can put their worksheets in.
3. Participants' weekly worksheets (3-hole punched). You could choose to hand them the whole pack at the beginning of the first session, but usually we hand them out each week when they will be used.
 - * On the front page of the protocol, and on the 3rd Week, there are places for you to fill in the names and contact information of your group's therapists and exercise consultants. Please do so by hand or electronically before handing these worksheets out.
 - * There are also places for you to fill out the dates of sessions on the second page of the packet. Please do this either by hand or electronically.
 - * Page 11 of the protocol needs to be printed off separately, so that you can print it Landscape style.
4. Weekly Record Forms for that week. Most weeks, just give them the one for the next week. Towards the end of the protocol, you may need to give them several if there's no meeting for a couple of weeks. Likewise, if a meeting needs to be skipped, like for a holiday, make sure you give them an extra weekly record form. You can choose to leave days/dates blank for members to fill in, or fill them in electronically before distributing them.
5. BDIs for each group member to fill out (3-hole punched). When you collect them, make sure they have a date, name and a session number on the upper right hand corner.
6. The previous week's BDIs. An undergraduate research assistant is in charge of xeroxing these each week and putting the copies in each group member's file. Please make sure the copies have been made and filed before you return the originals to the group members.
7. The previous week's Weekly Record Forms. As with the BDIs, the undergraduate should copy these, file the copies in the members' folders, and leave the originals for you to return to the members.
8. Videocamera, tripod and blank tape. Fill in on the label of your videotape: the date, the name of your group, and the session number. File these tapes in the lab in the video drawer.
9. Hamiltons: Participants are required to take the Hamilton approximately every 4 weeks: Session 5, 9, & 12. The week before you will need to come prepared with a

list of times that interviewers are available and hand these sheets to the group to sign up for times. Try to make the times before or after the session, so that members won't have to make 2 trips. Especially, make sure non-local participants get times that are either before or after group. For example, you could have 2 interviewers available the evening of a 7:00 group. Each could have a 6:30, 6:45, 8:40, and 8:55 time, for a total of 8 available appointments. Alternatively, you could have an interviewer give you some times in the days immediately before or after the session. Have the participants sign up for a time for the following week, and ask them if they need an email reminder of their time.

10. Before each session, go through with your co-therapist and decide who is going to talk about what. There are blanks at sections where it would make sense to switch speakers. You can fill in the initials of who is going to talk in each section.

11. Participants should need new fish oil approximately every 3-4 weeks. You should probably just bring a few bottles to every session and let them take a new bottle if they are ready.

Also:

1. Therapists should do a check-in by phone after 1st, 2nd session, 4th, 6th, 8th, 10th, between 11th & 12th session. Split the group in half and alternate which therapist calls which half of the group. At the check-in, make sure there are no problems that have come up, check in with compliance, use it as a time to build rapport. On non-phone call weeks, you may want to announce that they won't be hearing from you, so they won't wonder.

2. Manual is structured such that directions to therapists pre-session are bold-faced and italicized. Directions to therapists during session are bold-faced. Things that therapists should say verbatim are written in normal font.

3. Because there will be as many as 3 groups running simultaneously, please make sure that if any supplies are getting low, you either tell the project coordinator, or get more yourself. For instance, if we're running low on BDIs, put in a copy order. If we're about out of fish oil, tell the project coordinator.

4. Sessions should last between 1 ½ and 2 hours. Therapists should reinforce participants for providing support and feedback for each other. Ultimately, as the weeks go by, participants should be taking a more and more active role in the therapy sessions, and the therapists should be able to step back and let the group start to "run itself" to a certain extent.

TLC Project Contacts:

- Leslie Karwoski, Therapist & Project Coordinator
785-218-6336, karwoski@ku.edu
- Stephen Ilardi, Principal Investigator
785-864-9840, ilardi@ku.edu
- Chris Heath, Exercise Consultant

- 785-832-8926, H2Oballer@yahoo.com
- Aryn Hirani, Therapist
785-393-8926, ahirani@ku.edu
- Andy Lehman, Therapist
785-691-6359, kalehman@ku.edu
- Jennifer Prohaska, Exercise Consultant
913-226-8270, jennyprohaska@hotmail.com
- Susan Reneau, Therapist
785-760-1860, sreneau@ku.edu
- Dana Steidtmann, Therapist
307-760-8248, dsteidt@ku.edu
- Brian Stites, Therapist
785-312-0164, stites@ku.edu

Hamilton Interviewers:

- Robin Aupperle (VERY last resort- has offered to do them if we're desperate):
913-708-4766
- Angela Bodling: 785-331-4211
- Aryn Hirani (N/A first half of summer): 785-393-3818
- Cynthia Karlson: 785-312-4732
- Andy Lehman (last resort): 785-691-6359
- Danyale McCurdy: 405-760-6075
- Jill Nesbitt-Daly (limited availability): 785-749-6797
- Susan Reneau (last resort): 785-760-1860
- Brenda Sampat (only available Wed & Fri): 785-760-1117
- Dana Steidtmann: 307-760-8248
- Brian Stites (last resort): 785-312-0164

Session 1

Remember to bring fish oil bottles & notebooks for all participants!

Bring extra copies of the exercise permission form as invariably some will have lost theirs.

Bring some sort of name tags or name signs with markers.

I. Opening-BDI

- Welcome
- Therapist Introductions: Therapists introduce themselves, and give some background info, like degrees, experience with depression, etc.
- Outline basic structure of group, once a week for 10 weeks, then two more meetings spaced out. Each group meeting will last between 1 ½ hours and 2 hours. This first meeting will likely be the whole 2 hours.

A. Group Rules _____

1. Confidentiality: Anything said in this group is not to leave the group.

2. Videotaping: For purposes of monitoring the research program only. Members of the team may view the tapes, but they will be concerned with what the co-therapists are doing, NOT what the group members are doing.

3. Participation: We hope you will all feel free to participate as much or as little as you want. If you don't want to share something, you are under no obligation to do so.

4. Phone calls: First, here is our information, printed in the manual. There will be one phone call after the first session, periodic check-ins after that. Each call will be intended to last up to 15 minutes. Please make sure that you call us back, even if it is just to say that everything is going fine! Feel free to get in touch with us at any point, and we welcome feedback during group or individually.

5. We hope every member will be able to come to every session. If you need to miss, please call us and let us know in advance. It is important to us that you attend as many of the sessions as possible because otherwise you will miss too much information to keep up. If you miss more than three of the twelve sessions, we will work with you to either enroll you in another group or find another type of treatment.

B. Introduction of therapists and participants _____

- **Encourage participants to write their name on tags or a sign so everyone can learn them.**
- **Go around the circle (starting with therapists), have each participant say their name, where they're from, what year in school and answer one of the following questions, written on the board:**
 - 1. What are your hobbies?**
 - 2. Do you have any pets?**

II. Domains that depression affects: biological, cognitive, affective, behavioral:

- **Talk about how depression affects your life; list examples on a board under the appropriate category**
- All of you know in a very intimate, personal way what it's like to experience depression. But I've found over the years it's often useful even for folks who battle depression to take a step back from it- from that very personal subjective experience to look at it more objectively. Look at some of the ways that maybe your experience is reflected in the common experience of many people who have depression and maybe some ways that it's affected you distinctly and uniquely. Does that make any sense at all?
- One of the worst misperceptions about depression that I don't think any of you share, but you've probably encountered it many times is: you talk to your friends, or your loved ones, or maybe someone in your family, and people will say something like, "I don't understand why somebody would get depressed, I don't understand why somebody would stay depressed. Why don't you just snap out of it" or say something like that, as if depression were something that a person could just choose to go into and can will themselves out of. I think one of the reasons for that particular callous and very invalidating sort of comment is that people tend to think of depression, people who haven't experienced depressive symptoms tend to think of depression as a mood state that just affects mood, and fail to recognize that depression is something that affects functioning in many different areas that affect so many ways in which a person lives and just is.
- And so if it would be okay with everyone, I thought we could take a few minutes to look at just how depression affects different areas or domains. I'm hopeful that each of you will be able at some point, you don't have to do so, but my hope is that each of you at some point could share a little bit about some ways that depression affected you. I mean, you could just jump in as we go along.
- One thing that might be helpful in thinking about how depression affects a person is to think about 4 major areas of functioning. In some ways you might think these labels are a little bit arbitrary and in some ways they are. There will be some symptoms of depression that may span 2 or more different areas, but we typically think of it affecting biology (the way the body works and operates) and functions of mood, behavior, and thinking.
- Let's start with biology: the way in which the body functions. Can anyone think of a way in which depression has affected how the body operates?

Brainstorming session follows. Allow group members to generate the following symptoms. Direct clients to worksheet on p.3.

1. Biological Symptoms

Libido/ Sex drive: In fact, people with depression may find that their ability to experience any form of pleasure is either diminished or in some cases will just go away. It's not at all uncommon for someone with depression. Many of the patients that I've worked with have said to me, "You know Dr. Ilardi, it was really chilling to me that I was doing such and such and it was normally something that I would've

really enjoyed, and I was just a little bit indifferent.” So and that’s of course something that’s reflected in the functioning of the brain which can be thought of as a biological process.

Sleep: Yeah, and a lot of people that have never experienced depression or don’t know much about it, their first thoughts when they hear about depression is, “Oh, you must sleep all the time” and it turns out that there are some depressed individuals who sleep a lot, hypersomniac. That definitely can happen, but actually the most common pattern is insomnia and there are actually 3 different ways that that can happen.

People can have trouble falling asleep so we call that, onset insomnia. They can have trouble staying asleep, where they just wake up multiple times throughout the night, and then the most common thing is for people to wake up a lot earlier than they normally wake up, and have an enormously difficult time falling back asleep. How is your sleep? You said you don’t sleep very well.

There have been a number of studies that have actually looked at the architecture of sleep. Do you know what it means to actually look at brain waves and sleep patterns while people are sleeping? You’ve probably heard of REM, rapid eye movement sleep. And we find that the sleep architecture of the brainwave patterns of sleep in depression is very different. And the ways that the brain functions even has its attempts to get the right sort of sleep for the body is very profoundly affected.

Energy: You mentioned energy right? Just a feeling of being tired all the time, so energy levels can certainly be influenced, typically very low.

Appetite: Any differences in how much you eat? The types of food that you crave? Well so as we see, we heard appetite can decrease, increase, or even fluctuate in cycle for the same person across time. Anything else? Anything we might be leaving out?

2. Thinking

Concentration: All things being equal, if someone is depressed, they don’t concentrate as well, and very often their memory is impaired too. People find it more difficult to retain information and generate information on the spot. Has anyone noticed anything like that?

Prompt: How else does it affect how we think about things? What are your thoughts about yourself, about the world, about the future? Differences when depressed versus when you’re not depressed?

Worries: I’ve known people who sometimes say something like, “these people don’t necessarily want to connect with me.” Would it be ok to call that a negative thought? Very often depression can go hand in hand with beating yourself up. Being hard on yourself, in ways that you wouldn’t necessarily otherwise. If you can remember back to a time when your mood state was really high, and you weren’t battling depression. The way you think about yourself often falls in lock step with mood. Ok, so lots of negative thoughts.

Dwelling/ Ruminating: Yes, that is such a hallmark. We’re going to spend some time later tonight talking about that. The technical term for dwelling on

something is rumination. It's actually a farming term. Did anyone know that? The origin means cows chewing their cud. The metaphor is that we do the same thing with our thoughts; we just keep chewing on them. We can't let go of them, and it's like we can't swallow them. We just keep processing them over and over. This turns out to be really toxic. Especially when we dwell on negative things like during depression.

Hopelessness: The idea of "are things ever going to get better?"

Worthlessness: Low self-esteem, feeling low about yourself in general

Guilt: Wondering if you did something wrong, often a feeling of guilt because you are not accomplishing as much as you used to before you got depressed. Obviously a toxic cycle since the more guilty you feel, the more depressed you are likely to get.

3. Mood

Sadness: Of course, the most common mood state in depression, feeling down, sad, blue.

Irritability: Also, it's such a common thing, and so few people really recognize that irritability is a key symptom of depression.

Emotional blocking or numbness: People who are depressed often report a feeling of numbness, especially an inability to feel positive emotions.

Anxiety: Maybe nobody here has really dealt with this, but it's very common for anxiety to co-occur. Somewhere between half and two-thirds of people who struggle with depression have really significant anxiety that they battle at some point. Does anyone else here have that?

You don't have to answer this, but was anyone a little bit anxious or nervous about tonight? I think it takes a lot of guts and a lot of courage for each of you to be here tonight, and everybody's here.

4. Behavior

Social withdrawal: That's in some ways the hallmark behavior, the quintessential depressive behavior. Social withdrawal is almost universal in depression; it's so common. For some it can be quite paradoxical: you're lonely, but yet not really wanting to be with others.

It almost suggests to me in some ways that some of the biological functions might play a role. Like for example, often energy is so low. If you think about it, doesn't it take an enormous amount of energy to sustain a conversation that really engaging? Doesn't it? Yeah. Have you ever come back from a party and you're just exhausted? Even if you've really been having a good time. And so when somebody's depressed, and feeling the deficit of sleep and the deficit of energy and the deficit of concentration, we have to work harder just to track a conversation. You know, you might zone out for ten minutes. Isn't it embarrassing to try to come back into a conversation and you're thinking, "oh my God, I haven't heard anything this person has said in the last ten minutes!" and they're expecting an answer!?!

I find so many people that I've worked with who've been depressed are very sensitive, generous souls by nature, and often get great pleasure in doing things for

others, and they find that it's just not there. At least not there to the same degree. So decrease in activity level, and having meaningful conversations.

Are there any other important ways that you see behavior change? Things that you spend your time doing? We talked about things that you don't do as much, what are some things that you do?

Television watching: Again, that's a wonderful insight because of how low energy affects activity. And you probably know this from experience, but I was a little surprised when I learned that scientists studied people's mood states while watching TV, and for most people, their mood actually goes down. Their mood actually gets worse while watching TV. And a lot of times people get very inert, very lethargic while watching TV, even more than when they started. Even though it's supposed to be fun- and it's very tempting right?

Decreased care in personal appearance: You care less about what others think, seems to take too much energy.

Wrap-up to Domains of Depression:

- We could spend a lot more time on this, but in the interest of getting through everything tonight, I want to make one last point. You guys have done a great job by the way, of generating this list.
- This is something that I think all of you understand and appreciate already. Notice that because our bodies are not impermeably sealed off, one domain from another, that everything affects everything else and all these areas interact with each other. So anything that can affect any one of these domains will start tugging on all the rest of the domains, and that can work in a positive direction, or a negative direction. In a positive direction, the sense is that anything you can do therapeutically to improve any one of these areas will have positive repercussions in others. And inversely, anything that affects one of these in a negative direction can wreak havoc in some of the other areas.
- I'll give you a simple example. Some of you probably already intuitively get this, but let's just say sleep for example. What happens to you if you go 3, 4 nights in a row with horrible sleep? How does that affect your mood? **[Give participants a chance to answer.]**
- Yeah, you get cranky. Brain function gets compromised. I might get sort of spacey, my memory doesn't work as well, I might get irritable, and my energy might go down. How does it affect your behavior if you've gotten several horrible nights of sleep? **[Give participants a chance to answer.]**
- [Participant mentions the rejection of social invitations]. Yeah, you start shutting down. You start pulling back, conserving, withdrawing, you don't want to be around people. Does it affect the way you think about things when you're really sleep deprived? I think for some of us it does. I think often the world just doesn't look quite as cheery a place when it's viewed through very sleep deprived eyes. There's actually a lot of research on that, and it does tend to be the case.

- I'll just say this in closing, and then we'll move on. Traditionally antidepressant medication medicines have tended to target their effects right here, on biological. At some point in the group we may talk about how medication affects the brain. By virtue of targeting our biology, targeting what the brain does, the hope is and often the reality is, that it will begin to affect all the other areas in a positive direction.
- Psychotherapy approaches historically have targeted the way we think about things and what we do. In this therapeutic approach that we're going to be using, we're going to be looking at interventions that target all four areas simultaneously. We're not going to leave any stone unturned. The hope again is that we will see positive gains in each area that is affected in each of you.
- Any questions about anything here? We've covered a lot and I think a lot of this is probably familiar to you in a lot of ways, but is there anything that feels unclear?

III. Rationale and general outline of protocol: _____

- **Direct clients to worksheet on p. 4.**
- You can see that the symptom groups we mentioned have played a big role in everyone's lives lately. You are not alone in what you are feeling. Not only that, but these symptoms are becoming increasingly prevalent in our society. You may not be aware of this, but rates of depression are about twice as high in your generation than they were in your parents' generation. Today, this lifetime risk stands at nearly 20%: almost one out of every five people alive right now in the U.S. is expected to suffer from depression at some time in their lives. Use of antidepressants has skyrocketed- compared to two decades ago, 8 times as many people are on an antidepressant drug. It hasn't always been like this; instead, there seems to be evidence that our risk for depression is continuing to grow.
- Why the epidemic of depression? What is causing people to get depressed more than they used to? In short, we believe that the world in which we live has some qualities that are toxic to many people's mental health and may actually contribute to depression. This is due to the fact that the modern human's mental and physical traits were designed not for life in the 21st century United States, but for an earlier period in human history.
- Consider life in the relatively recent past: say, during the mid-19th century. Even though at that time people were beginning to spend more time working in factories and larger businesses, much like we do today, a far larger percentage of the population was still living in rural areas working on farms. People had to venture outside of their homes for food, to work or to buy necessities of life, or simply to get from one place to the next. It wasn't like today where people can sit in their offices, homes, and cars for literally days on end, since the lack of electricity and automobiles meant that people had to get out and walk places. And families would usually live together in the same area, or even in the same dwelling, for generations on end. The world has changed a lot- sometimes it's surprising that humans have been able to keep up.

- Now let's go back a few thousand years. Early humans lived in an environment virtually untouched by technology—a world that bears almost no resemblance to today's. This is the world the human body was actually designed for. Many have argued that the mismatch between this early environment and the environment in which we live today explains increasing rates of depression. It seems that the modern environment may have characteristics that actually increase our risk of depression. What differences can you think of between the way people lived thousands of years ago and the way we live now that might contribute to an elevated risk of depression?

[The therapist now conducts a brainstorming session in which he or she records the answers provided by the participants on an overhead projector, chalkboard, etc.]

[The following are marginal answers that the participants might provide to the brainstorming prompt. Each cluster of related answers is followed by items in bold that are prompts designed to encourage the participants to refine their answers to correspond to the factors that are actually to be addressed in the Therapeutic Lifestyle Change.]

- Ways we get food have changed; hunter-gatherer societies have become consumer societies; making meals to satisfy multiple people—So how has a change in the availability/variety of food affected our mental health?
- Food has become more processed/artificial; food is not as good for us anymore—What particular foods are no longer a part of our diet that early man might have had or eaten larger quantities of? What nutrients are lacking in today's environment?; Are there any general health consequences to eating low-quality food?
- Spending a lot of time watching television; modern world puts high value in entertainment that allows us to “zone out” or to spend our time unproductively—How are these forms of diversion different from those that might have been part of an ancient culture?; What types of activities might ancient humans have had?
 - **[If prompting for Increased Social Contacts]** To what degree do we tend to participate in activities alone as compared to ancient people? Are group activities as common today as they would have been thousands of years ago?
 - **[If prompting for Exercise]** Are there any general health risks associated with watching television/not being actively involved in activities for our diversion?
- Tribes don't exist anymore; no longer nomadic—How have our social interactions changed over human history? How has the idea of “family” changed in modern times?
- Pollution; development of ugly cities—Why would ugly cities/pollution be a problem: does it have more to do with the urbanization or more to do with the ugliness/pollution itself?

- **[If prompting for Pleasant Activities or Exercise]** Is there anything that a poor quality of environment keeps you from doing that you might otherwise like to do?
- **[If prompting for Increased Social Contacts]** Is it possible that living in cities might contribute to an increased feeling of isolation?
- Walking is not as important nowadays; we don't get outside as much; being in cubicles every day—What is it about walking/being outside that might have therapeutic value?
- **[If prompting for Sunlight Exposure]** Are there any types of days or weather that you find more enjoyable for spending outside? Do you feel less depressed during certain types of weather?
- **[If prompting for Exercise]** Are there any general health benefits to walking/getting outside?
- Shelter has changed; thousands of years ago, humans would have lived in tents or caves rather than in houses—What practical issues aside from getting food might have prevented Stone Age humans from spending as much time in their shelters as we do indoors? **[used as a prompt for Sunlight Exposure]**
- Proclivity to use medicine; solving problems with pills—**[Although this answer is not directly related to any of the factors addressed by the Therapeutic Lifestyle Change, this answer provides an opportunity for the therapist to provide a brief summary of the issue of mind-body dualism and the rejection of this dualism in this therapy. This explanation can be concluded by the assertion that “What and how a person is thinking during a depressive episode has as much to do with contributing to the depression as any overall chemical imbalance.” Discussion of this topic here will facilitate the introduction of rumination later on in this session.]**

Wrap-up to brain-storming session:

- It's clear that our lifestyles have changed considerably and that we're living very differently from the way people used to hundreds or thousands of years ago. On the surface, it's tempting to think of all of our technological and societal changes as good, and in many ways they are markers of progress. However, as we said earlier, we believe that a number of these lifestyle changes have contributed to the epidemic of depression. This idea is supported by several research studies that have shown how changing various aspects of our postmodern lifestyle can help reduce or eliminate depression.
- **[Point to the board where these lifestyle factors have been recorded]**
- **Exercise:** For example, people used to get plenty of exercise and spend lots of time outdoors because they mostly worked outside. Nowadays, though, many people have jobs that require them to sit indoors, often staring at a computer screen for hours on end.
- **Light Exposure:** People aren't as active as they used to be, and we also miss out on a lot of sunlight, compared with people who used to work outside all

day. Interestingly, both exercise and light exposure have been shown to help alleviate depression. Those lifestyle changes have an effect on our biochemistry and impact our mood. When we start getting more exercise and more light—like our ancestors did—depression starts to lift.

- **Social support:** Another example has to do with stress and social support. I think most of us would agree that life today can get pretty stressful. Most of us have several things going on at once, and we worry about getting it all done. Our schedules become full of deadlines and to-do lists. Because we have so much work to do and because computers allow us to do a lot of it at home alone, we end up not spending as much time hanging out with other people. Even when we want to unwind, many of us read, watch TV, play video games, or surf the net—which usually means even more time spent alone. On top of this, our society has become more mobile. In some ways, this is great, but it also means that a lot of us move around quite a bit and often end up leaving family and friends behind. This is a sharp contrast to the way things were before transportation became so highly developed. People would often live their whole lives as part of a single community. Family and friends were never far away. Hardly anyone lived alone, and very few people would go through an entire day without human contact. You might wonder whether being alone is really such a big deal, but research on depression suggests that it is. One reason is that when we're alone, we tend to spend more time thinking about whatever's bothering us. We become more self-focused, and our problems can seem to snowball as we churn them over and over in our minds. Being with other people gives us someone else to talk to about our problems, but it can also help us get our mind OFF our problems—and maybe even onto helping someone else. Being around others also helps us be more active. This may mean we're getting more exercise than if we were sitting home alone AND usually means we're having more fun than if we were by ourselves stressing out. We start to feel better when we feel loved and cared for by other people, and laughing and joking around can do wonders to improve our mood. The bottom line is that being around other people is good for us.
- Because of the way society has changed, we may have to work harder at it these days than people did hundreds or thousands of years ago, but if we do, we're likely to reap the same kinds of benefits they did and be less depressed.
- Essentially, that's what this group is about. As the name suggests, our work in the Therapeutic Lifestyle Change for Depression will focus on changing aspects of our daily routine and activities in a way that will not only alleviate many of the symptoms of depression but that also will prevent their recurrence. We believe that depression is not just something that happens internally, but something that is caused by our environment as well. Over the

next 14 weeks, we'll be talking about different lifestyle changes that you can make to overcome depression. The strategies we'll suggest are all backed by research, and we'll talk more about the specifics of how each one works as we go along.

- Although there are some modern methods of coping with depression, such as taking anti-depressants, we think there is wisdom in seeing what we can learn from the way people lived before depression became a huge problem. Medication does work for some people, but often they find that when they come off the medication, they get depressed again. The benefit of making lifestyle changes is that it can help you feel better now AND increase the likelihood that you will KEEP feeling better.
- Does that make sense? Are there any questions?

IV. Importance of proper nutrition; outline expectation that everyone will take a multivitamin every day as well as the requisite dose of fish oil: _____

- **Direct clients to worksheet on p. 6-7.**
- So during this therapy, one of the most important things we will be doing is trying to make sure that you all are getting the nutrients that have been shown to be most important in treating and preventing depression. Our diets have changed drastically over the past 1000 years.
- Imagine a time before grocery stores full of packaged and processed foods, or before there was a McDonalds on every corner. Imagine a time where almost everything you ate was completely free of additives and chemicals and people rarely referred to anything as “all natural” or “organic”, because *everything* was organic and natural.
- You have probably heard the countless news reports on the obesity epidemic in modern society, but you may not have heard about the lack of a certain dietary necessity called Omega-3 fatty acid that is essential in brain development and proper functioning. Omega-3 fatty acid comes from naturally occurring plants but is most useful to humans when we acquire it through the animals that eat the natural plants containing the Omega-3 fatty acid. Omega-3 is something that humans used to acquire enough of through things like free grazing cattle and chicken as well as fresh ocean fish like salmon. But since the beef and chicken that you get at the grocery store now is most likely not free grazing, the sources for obtaining Omega-3's are less readily available. Omega-3 fatty acid is not something that the body can just produce itself, so humans must find other sources such as a dietary supplement.
- So what do Omega-3 fatty acids do, and why are they so important? Several studies have shown that Omega-3 fatty acids can have antidepressant qualities like those of some prescription antidepressants such as Paxil, Prozac, and Zoloft. There are certain properties in this fatty acid that can assist in efficient brain functioning and processing in the same areas of the brain that control some aspects of depression. Several important research studies have shown

that a diet rich in Omega-3 fatty acids can help prevent depression and aid in the treatment of depression.

- You may be wondering how all of this actually works. Studies have shown that a diet rich in Omega-3 fatty acids allow the circuits in the brain to function more efficiently. These tend to be the same circuits that also function according to serotonin and dopamine levels in the brain. Serotonin and dopamine are two chemicals that are associated with depression. Serotonin and dopamine levels tend to be low in people that are depressed, and thus those circuits don't work as well as they should. The Omega-3 fatty acids aid those circuits in performing their intended function more efficiently.
- It is also important to mention that the circuits Omega-3's work on are the same ones that prescription drugs like Paxil, Prozac, and Zoloft affect. Omega-3's have actually been so effective, that in some studies they have outperformed some of these more widely known prescription medications commonly used to treat depression.
- There are three versions of Omega-3 fatty acids; ALA, EPA, and DHA. ALA functions mainly to maintain a healthy heart and circulatory system, but the other two are critical materials needed for a healthy brain. EPA is used to aid the functioning of neurons. DHA is important for the structure of the brain itself. Scientists have found it so important that they have made a special effort to put more DHA into infant formula because it is such a critical material for the developing brain to have in infancy and beyond. It's important that you know the subtypes of Omega-3's just so you know what to look for when buying supplements.
- Now that you know where Omega-3's come from and what they do, you may be wondering why we started talking about the environment hundreds of years ago. We have already made the connection that our modern environment and diet lack this essential fatty acid and that this dietary necessity has shown to decrease symptoms or feelings of depression, but there is even more important information on this subject that you should know.
- There seems to be an important correlation between the increased rate of depression in modern society and the decrease in the amount of Omega-3 fatty acids available to humans in their diet. The studies that show the positive effects Omega-3's have on decreasing symptoms of depression reinforce the idea that our brains really need this essential fatty acid in order to function properly in our environment.
- Further research has indicated that individuals taking a daily dosage of 1 gram of Omega-3 fatty acids in supplement form showed a great improvement in mood and a decrease in their depressive symptoms. Specifically, the ration of EPA to DHA in these studies has been approximately 2:1. This is the ratio you should look for if you buy it- about 1000 mg of EPA and 500 mg of DHA.
- We will provide Omega-3s for you while you are in this program. The brand that we get is called NOW, and it is from the Merc (**bring out the pills,**

distribute!). To get the full recommended dose of EPA, you'll have to take 6 of these per day.

- We have already established that Omega-3 fatty acids are a dietary essential, but there are also other important nutritional changes that can assist in the treatment of depression. We know that our diet in the modern world, and especially in college, is lacking several very critical components. It is very easy to combat this problem: just take a daily multi-vitamin. It is pretty simple and convenient as well as relatively inexpensive. A multi-vitamin pill contains lots of things you need in your diet, but we will just focus on two for right now: vitamin E and vitamin B (B6 and B12). Vitamin E is important because it will help your body digest the Omega-3 fatty acid supplement that you will be taking so that your body will get the most use out of it. The B vitamins, namely B6 and B12 have some of the same depression fighting properties that the Omega-3 fatty acids have. Several studies have also shown that people suffering from depressive symptoms tend to be deficient of B vitamins. Replacing those B vitamins lacking in one's diet may have great positive outcomes for those of us suffering from depression.
- So what we are asking you to do is take the Omega-3 supplements that we are providing. If you look on these weekly calendar forms, you'll see that there is a place to record whether you take an adequate dose each day. Furthermore, we need you to buy some multivitamins and start taking one each day and recording that as well.
- Questions? Concerns?

V. Rumination: _____

- Direct clients to worksheet on p. 8
- There's one concept we mentioned to many of you in screening you for the study: rumination. We want to talk a little more about it today. [Write on board or direct them to turn to handout.]
- What is it? This is what a lot of people are talking about when they talk about worrying about something, or stressing out over something. It is overthinking, a tendency to dwell on petty things, to mentally replay things that didn't go the way you wanted, and to wallow in sad feelings. People will have something normal but disappointing happen, like criticism at work, or rejection by a friend. Sometimes these things aren't even real, but are just the person's perceptions of a situation. Then they will mull the problem over and over, perhaps mentally beating themselves up for it, without being able to come to a resolution or move on. It's almost like a tape of negative statements playing over and over in your mind. Dwelling on the problems causes a snowball effect, as the person then starts feeling bad or guilty for spending so much time focused on these feelings of negativity.
- What do people normally ruminate about? Usually it's about what they have done wrong or what could go wrong. Rumination is a key characteristic of depression; it is the hallmark of depression. Thus, people with depression overthink their problems and do not act to resolve them.

- People who habitually ruminate but are not depressed are more likely than non-ruminators to develop depression later. It seems that this style of overthinking negative things makes people more vulnerable to becoming depressed.
- How does it work to maintain and deepen depression? Research studies have shown that the more someone ruminates, the worse their depression is: more symptoms, low motivation and concentration, increased stress, and even delayed recovery from the depressive episode. When people are distracted from rumination in a laboratory setting, their memories, interpretations of current events, and predictions about the future are much less negatively toned. They are able to problem solve much more effectively once the rumination is cut off.
- Rumination is linked to two things: level of stressful events in your life, and lacking a sense of mastery or control over these things. For many people, experiencing stress causes them to come up with some strategies for problem-solving. People who are depressed, however, do not feel a sense of control over these things. Rather than trying to solve their problems, they are more prone to contemplate what is wrong with their life and wish it was better.
- Rumination also involves wondering what the outcome of stressful events will be. Because being depressed causes people to think more negatively- see the world through dark-colored glasses, the rumination process leads them to conclude that the worst possible outcome will happen.
- Rumination prolongs and enhances the negative thinking associated with depression, interferes with good problem solving, and causes friction with friends and family. These processes over time increase depression and may prolong the episode. Thus, noticing rumination and taking steps to stop it is one of the most important things you can do for yourself.
- That's so huge. If I could just underline that point right there. That's so huge as a first step, just awareness. That's so important, because have you ever found yourself ruminating for a great deal of time, and not even realized that you've been doing it? It's remarkable how easy it is for us to get caught in that habit of ruminating for a great deal of time, and not to even have the level of awareness to realize that you're doing it. And very often just taking that first step and recognizing that you're doing it will then give us the ability to get a little bit of [critical distance] and say, ok, what will help me? What can I do now that I see that I'm doing it? At least now you have a fighting chance. It's going to take some practice for everyone here, but I think that's the first step.
- It is impossible to just snap your fingers and stop ruminating, but we are going to begin the process tonight. We'd like for all of you to begin monitoring and noticing rumination. Become aware of it when you're doing it. Just the awareness of rumination is half the battle, but we'll be giving you other strategies to use to stop ruminating throughout the group.
- There is one other thing we want to mention before you leave tonight. This treatment (unfortunately) does not act like a magic wand. When you leave here

tonight, you are still going to have some good days and some bad days. You may even have some good weeks and some bad weeks. But over time, the stretches that you feel good are going to start to get longer, and the stretches where you feel bad are going to start to get shorter. All of the changes that we are asking you to make take time. You may sense some instant benefit, but there will also be slow changes taking place over time. So we want to warn you up front, that you will likely observe an up and down pattern to your symptoms. Please try not to let that be too discouraging for you! Every patient who has been through the TLC program has been much better at the end than they were in the beginning. And every one of them has seen their symptoms fluctuate for a while, especially at the beginning.

At conclusion of the session, remind patients of homework (listed on p. 8), and that the therapists will be calling them at some point during the week to do a check-in.

Remind group members to bring exercise permission forms. Give them extra copies if needed.

Mention that if he hasn't already, Aryn Hirani, a graduate research assistant, will be contacting them sometime during the next week to schedule another interview, which will be a personality assessment that will be important for us to have in our research. If they are non-local, Aryn will make every attempt to schedule this interview right before group. This interview will last about 45 minutes, and will be the only other long interview we need them to do before the group ends.

HOMEWORK FOR SESSION 1:

- 1. Buy and start taking multivitamins.**
- 2. Start taking Omega-3 fatty acid supplements.**
- 3. Record daily mood rating, vitamin & Omega-3 use on calendar.**
- 4. Become aware of rumination.**

Session 2

I. Homework Review

- **Agenda:** We'll always try to start group promptly 5 minutes after you arrive. That way, you'll have a few minutes to fill out your BDI when you get here. If you haven't finished when we start talking, please put it to the side and finish after group is over. If you know you want a few extra minutes to fill it out, try to get here a bit early.
- From here on, most sessions will begin with a review of how everyone's weeks were, especially with regard to the changes we are encouraging you to make. After about an hour, we will shift the focus to introducing new material. So, ideally, there are ____ members; that means during the first hour, everyone will have the floor for about ____ minutes. I know that doesn't sound like much, but we know everyone will want to share how their week was, and we want to make sure everyone gets a chance.
- **Collect exercise permission forms or remind participants to bring them!**
- **Cover the following topics as much as possible with each member:**
 - How was your week with respect to symptoms of depression? Any changes?
 - Any trouble filling out handouts? (don't ask this directly unless you sense some confusion)
 - Did members buy and begin to take vitamin supplements?
 - Did members take fish oil?
 - Did members notice rumination? What did you notice about daily mood ratings?

II. Anti-Rumination Strategies _____

- **Direct clients to p. 9-10.**
- We talked about what rumination is last week and asked you to all make a point of noticing when you do it. It is important to recognize that for most of you rumination has almost been a way of life. It is something that is almost involuntary like a habit. It is almost effortless and spontaneous-- like you could do it without even thinking about it. With anything that is a habit, it is going to take some time to change it. Imagine if you found out that the way you had been tying your shoes was all wrong and you had to go back and re-learn that process. Rumination is a habit in just the same way, and recognizing it is the first step.
- Priming is when you think about one things and it lights up all these associations in your brain's network. We actually tend to organize memories and perceptions on the basis of the mood states associated with those things. When we start ruminating about something negative, it cranks up the negative mood. As this intensifies it starts to light up related negative thoughts and this can spiral out of control.

- Tonight we'll concentrate on behaviors that you can use to cut off the cycle of rumination once you notice it happening. What are the most frequent times you find yourselves ruminating? **[Write on the board.]** So, what do you think are some ways that you could prevent yourselves from ruminating so much? **[Take suggestions until clients mention pleasurable activities].** Okay, so when you were ruminating and you wanted to stop you could
- There is a really tragic thing that often happens in depression: people will let go of activities not only that are stressful, but also those that are enjoyable. There are a whole array of reasons why this could be ranging from predicting that it won't be fun to loss of energy.

III. Behavioral activation _____

- There are a couple more points we want to make about the importance of becoming more active. It has been found in controlled research studies that a gradual increase in activity levels can have a mood uplifting effect. Most depressed people report more rumination and pessimistic thoughts at times when they are physically and socially inactive. Then they tend to criticize themselves not only for their withdrawal but for their negative thoughts. People with depression find it difficult to undertake or complete jobs they accomplished easily before the depressive episode. By scheduling activities in therapy, we hope to counter this loss of motivation by helping you articulate what you would like to be doing with your time.
- There are two different types of activities that we can think of engaging in: the want-to's and the have-to's. The have-to's are the things that we don't really intrinsically enjoy, but it feels so good to get them done. The task in and of itself is not that pleasant, but there is a feeling of relief or pleasure in getting it done. The want-to's are things that could actually make us feel better were we to do them, but we stopped doing them because of the depression. What has been found is that each type of activity has certain benefits. Both of them are useful or can be useful in redirecting rumination. When we ruminate, it is usually helpful to think, "I am ruminating and know I will get involved in some sort of activity." Which type of activity do you think would be the most helpful?
- Consistently I have heard both of these responses. Often we don't want to give ourselves the right to do the want-to's. It is like we haven't earned that right, but when people are depressed it is usually the case that it is easier to get redirected with the want-to activity. If we can get to the place where you can give yourself permission to do so.
- When we engage in something pleasurable, it actually illuminates a certain part of the brain that counteracts depression, specifically the left frontal cortex. The left frontal cortex will light up when we go after the things that we want and when it lights up we are in a positive mood state. When it gets quiet and the other side lights up, we avoid the things that we don't want and we get shut down or are in a bad mood. Depression is characterized by the

left frontal cortex being very low. Anything that involves going after what we want will elevate the left frontal cortex and consequently our mood. *If you have trouble rationalizing doing the want-to's just explain to yourself that by doing those activities you will actually be able to do more of the have-to's.*

- So one thing that is going to be important when you are ruminating is to do something fun. And sometimes this can be really difficult of get yourself to do, especially when you are depressed. Do you agree with this? Is it difficult? Do you find yourselves doing fewer fun things than you used to? **[clients indicate that they do].** This makes sense because one of the symptoms of depression is not enjoying things as much as we used to. But if we still try to do things for fun, it can help us stop ruminating, which can help us feel less depressed and be able to enjoy the fun things even more.
- What works the best? How do you cut off rumination in your life? For each of you, there are going to be certain types of activities that really improve your mood that you are not getting enough of. The key is to recognize the different types of pleasant activities and which are most effective in raising your mood. Think of what our ancestors spent time doing.
- Tonight we'd like you to begin the process of using pleasurable activities to stop rumination. Sometimes when you're feeling depressed and already worrying about something, it's hard to think of what might be fun. So what we'd like you to do now is to think of at least 3 things that you can do if you catch yourself ruminating. They should be things that will be enjoyable. (You're not trying to punish yourself for ruminating!) And they should be things that you can actually do during the week. (That is, "Going to Vegas" doesn't count.)

[Have everyone right down at least 3 pleasurable activities—in a designated spot on Anti-Rumination handout—and share them with the group.]

- **[Optional: in response to some activities not being distracting enough].** Does anyone ever find themselves doing one of these things? And yet their mind is still freed up to ruminate even so? I notice that you said housecleaning. I talk to other patients that say they sometimes try to exercise. Sometimes with an activity like that, where the hands are busy but the mind is free, they'll say that even though they were cleaning the house, they felt like they were ruminating even more, and they felt worse when they were done than when they started. Does anyone here feel that way? Is it worth taking a minute to think of a way to take a potentially helpful activity, but one where we might find ourselves ruminating, and turn it into a way in which we can't really keep ruminating?
- **[Optional: regarding rumination while exercising]** I was working with someone that tried music, and they said, "No, I would just tune it out." Or they would listen to really sad music that would perpetuate their feelings, like country music that said, "you tore out my heart, and stomped that sucker flat."

And so they were trying two other things. One was books on tape, and the other was working out with a friend, combining social interactions with exercise. So when a person is really caught in rumination, and activity has to be so absorbing and I guess individual results will vary. I know for myself, that when I'm cleaning house, my mind can spin a hundred miles an hour, and it's just not absorbing for me. Sometimes that something is really challenging can be a crossword puzzle. Or for myself, something that's a totally goofy activity, is playing (fill in fun game). And there's something about being involved with that game that's very absorbing...for some people.

- We'd like for all of you to get an idea of how you're spending your time, that is, what are you really doing during the week and how does that affect your mood. In addition, we'd like you to actually schedule in pleasant activities--one per day. They can be anti-rumination strategies that you already thought of, or something else. For instance, another type of activity that makes people feel really good is doing things that make you feel like you've accomplished something. Success activities make you feel skillful or competent, something that makes you feel like you have done a good job on something. Perhaps you should set a goal to learn something better. Take lessons (Lawrence Arts Center), join a hobby group.
- And don't stop with what you've scheduled. We'd like you to try to implement these strategies any time you find yourself ruminating.
- Any obstacles? Anyone who doesn't do a pleasant activity unless it's someone else's idea? Maybe you should think of something pleasant you'd like to do, and invite others to join you.

On the following chart of weekly activities, please: _____

1. Write in the blocks the obligations that know you have, like school, work, or other planned activities.
2. Fill in the things that you'd like to do that are good for you, like light exposure or exercise.
3. Choose one pleasurable activity-- could be something you already wrote down or something else-- per day and write it in.

At conclusion of the session, remind patients of homework, and that the therapists will be calling them at some point during the week to do a check-in.

HOMEWORK FOR SESSION 2:

1. Record pleasurable activity completion and rating on weekly record form.
2. **Continue to record daily mood rating, vitamin & Omega-3 use on weekly record form.**
3. **Fill the weekly chart out completely and make sure you do your scheduled pleasurable activities!**

Session 3

Before this session, arrange with exercise consultants to be at this meeting. You will retrieve them towards the end of the session to meet and coordinate meetings with patients, probably in the last 10-15 minutes of group.

I. Homework

- How are the fish oil pills working (**2 weeks is the time when many patients report noticing a difference**)? Liquid form if anyone needs it. Any changes in depressive symptoms?
- **Check to make sure everyone filled in weekly activity schedules; ask about experiences.** Did they schedule pleasant activities? Rate them before and after?
- Anti-rumination strategies? Is the meta-awareness helpful?

II. Exercise (45 minutes)

Section 1: _____

- **Direct clients to p. 13-18.**
- Theoretical basis for our treatment: If you'll recall, we're claiming that the human brain functions ideally in conjunction with a lifestyle that largely reflects an older way of living, typified by regular physical demands for day-time activity, close-knit social structure and some important nutritional elements. The human species has spent over 95% of its history in an environment that was very different than our own. Over the past thousand years there has been this incredible technological development, but in many ways our body has not developed to that world.
- American society has made some very radical shifts in behavioral demands, many of which contradict the behavior for which our brain had been adapted. For example, jobs today typically require sitting at desk, inside, staring at a computer screen; recreational activity probably involves watching a TV; and transportation requires little more effort than walking fifty feet to and from our cars. People don't need to exercise anymore, ever, if they don't want to. And an unfortunate side effect of this is that an activity that elevates mood and protects against depression is no longer a part of most people's daily lives.
- Recalling your historical roots, what activities might have required a significant amount of physical exertion? Can we think of anything? How about jobs? Hobbies? Transportation? What sorts of social activities might have been physically demanding? **[Brainstorm for a minute about physical activities. Hunting inevitably comes up first, but transportation by foot should come up, as well as manual labor-type of activities. Promptable responses could include social dancing or other social rituals. Encouragement and reinforcement, as well as demonstrations of activities may be included.]** Right! Now, we might expect to encounter any or all of

those activities on a daily basis in the past, but what about today? How often do we trek through the woods for hours on end to hunt down our dinner? Probably, not often. Okay, but how much do we walk in a day? What need have we in our society to exert ourselves all that much? We have cars, appliances, pre-processed foods. In a sense, our lifestyles have become sedentary.

- One result of this change in lifestyle can be seen with the problem of obesity in the United States. The Center for Disease Control has defined 60% of us as overweight and ¼ as morbidly obese, but why would this be the case? People have never been in a situation where people have a consistent source of food. Our bodies are calibrated to have a limited supply of food. This also explains our cravings for fat and sugar because in the ancestral environment these were the necessities. While the brain is functioning the way it was designed, it is not functioning the greatest for us.
- One of the cardinal symptoms of depression is a significant decrease in energy. And your level of energy is directly related to how much activity you'll want to do. Engaging in regular activity is like pre-setting our brains for a higher level of energy. It's like, "I expect to do this much work over the course of the day; please have a sufficient amount of energy available so I can make that happen. Thanks!"
- Likewise, when we aren't active, we have less energy. We can look at that relationship in a number of ways, as it pertains to depression. The first is more obvious – decreases in energy and activity are related to that which *causes* depression. The second is a little more fun – increases in activity, and hence energy, are related to the *relief* of depression. And one step beyond that, we propose using increased physical activity as a means of *treating* depression.
- If you've exercised before, you may have noticed that you had more energy. Initially it takes so much effort, but eventually it will actually get you more energy. The brain seems to have an internal mechanism that keeps track of how much energy we are expending every day and then calibrates the overall level of arousal in energy expenditure for the next day based on that finding. Our energy is calibrated based on the demands that we have put on ourselves. The brain will sense that we are being more active and crank up that amount.
- As we've discussed, there isn't much demand for physical activity in our daily lives. Society just isn't designed that way, anymore. So, we're going to ask you to engage in a regular exercise program, to try to recreate some representative level of activity as might be found in our historic origins. Why? Is it just for your health? Are we trying to prevent heart disease? No, we're actually more interested in the mood-elevating properties of depression.

Section 2: _____

- There have been several studies conducted that look at the effect of exercise on depression, and the general finding is that exercise is about as effective, if not more effective, than most of the front-line medications. In fact, there's a

health clinic in California that treats depression with exercise alone, no medication at all, and their treatment effects are staggering. In general, the rate of recovery is very high, hovering around 80% and the rate of relapse is extremely low at about 25-30% (compare that to 80% relapse with med discontinuation). Even better, there aren't side effects like you might find with medications. So, there's none of that weight gain or sedation or sluggishness that you might typically expect on a depression medication. Another study had patients at a hospital evaluate the usefulness of physical fitness training in helping them recover from mental illness. They ranked physical fitness training as the most important element, above psychotherapy, medication, support from other patients, and contact with nurses.

- Now the fact that exercise is good for you is not exactly breaking news. A show of hands – who here knew that exercise was probably a good habit to get into before I ever said anything, today? Okay, but who here gets regular, vigorous exercise, 35 minutes, at least three times a week? I wouldn't sweat it. Neither does somewhere around 75-95% of Americans. But hopefully, we're going to change that with this treatment.
- So we want you to exercise. You might have a sense of panic in anticipation of these grueling workouts, but let me promise you, it's not as hard as you might think. The idea is much more daunting than the doing. But we're going to walk you through that in a bunch of different ways, today.
- What we want to do, overall, is draw up some exercise schedules, so that we can measure how much exercise you're getting a week. The first part of this is figuring out where lies our initial fitness level. To do that, we need to estimate an appropriate level of current activity. I want you to write down what kind of regular exercise you've been getting for the last few months. Don't worry if you haven't been getting very much, because that's kind of the expectation with depression.

Section 3: _____

- The next thing we need to do is figure out a starting point for exercise. For this protocol, we're looking for optimal activity, which ends up averaging around 40 minutes of moderate physical activity – in other words, you're breathing heavily – at least three times per week. But we don't expect everybody to jump on a treadmill and go for a 35-minute jog. Most of you probably won't be able to do that in the beginning. So what I'd like you to do is write down an estimate of how much exercise you think you could comfortably do in your first workout. Give me an estimate of pre-depression exercise capacity – what I mean is how hard you were working and how long you could go – and the types of exercises you were doing. Let me know if you were lifting weights, playing sports, regularly walking, or anything else that might fall into an exercise category.

Section 4: _____

- **Get exercise consultants. Have patients introduce themselves.**
- The next thing we should do is set our goals. What we'd like to do is build your level of activity to that goal, 35 minutes of aerobic activity, three times per week, using anything that might keep your heart rates up. (Discuss different exercises, cross-training, stretching, sports, exercise projections).
- The last thing we need to do is figure out how to keep you on schedule. One of the hardest things to do is stick to regimen. Most people drop out of that part of treatment, so we need to brainstorm some ideas about how to keep everybody engaged. (Discuss personal trainers, exercise logs, group activity, an accountability system, going with friends, exercise classes available through KU Fit.)
- Discussion: past experience with exercise- did it help you? Was it hard to stick to and why? Therapists challenge negative beliefs and encourage other group members to do so as well. Make sure to warn about danger of rumination (15 minutes).

Section 5: _____ (An exercise consultant could do this part)

- Heart Rate – a basic measurement of intensity. The easiest way to determine the intensity of a workout is to measure your heart rate during or at the end of the exercise – but how do you do that!?
- Heart Rate Monitor: Equipped on the cardio equipment in the gym

Wrist or neck pulse: follow this step-by step procedure

1. Place your fingers on your wrist or left side of your neck
2. Find a throbbing pulse
3. Count how many times you feel that throb in 15 seconds.
4. Multiply that by 4, and that measures your heart rate.

<u>Bpm (heart rate)</u>	<u>Indicates</u>
170 and above	Potential medical problem
140-160	High Intensity
120-140	Moderate Intensity
Below 110	Low Intensity

- Some notes about Heart Rate:
 - Average resting heart rate varies greatly, depending on stroke efficiency – from 60-90 bpm – but that doesn't significantly change target heart rate.
 - It takes the heart some time to “warm up” for exercise before it reaches optimal heart rate – about five minutes.
 - It also takes the heart time to “cool down” after exercise, before it returns to a resting state. That time will vary by fitness level, but it averages around two minutes.

- Warning Signs – Some potential concerns
 1. Lightheadedness
 2. Dizziness
 3. Loss or change in vision
 4. Sharp pain in chest
 5. Inability to breath
 6. Serious pain in joints

***If any of these conditions should arise, please discontinue exercise and consult a trainer or doctor.
- Participants get exercise logs, draw up a commitment to a schedule for the following week
- One more thing we want to caution you against is going overboard with exercise at the beginning. Sometimes we have seen patients who are so anxious to get well that they really go out and start exercising with a vengeance. If it's been a while since they've pushed themselves that hard, they inevitably feel very sore and fatigued for a couple days afterwards. Test your body's limits slowly, because if you're sore and tired, you may feel discouraged about exercising in the future.
- **Have exercise consultants schedule appointments with patients, and exchange phone numbers and/or email addresses. *Remind patients that meeting regularly for 6 sessions with the exercise consultant is a REQUIRED part of the protocol. If the ex-con calls them, returning their phone call is just as important as anything else we are asking of them. If they cannot find times that work with their schedule to meet, this issue should be brought to the therapists so that a different ex-con can be assigned to them. If an exercise session is skipped one week, it needs to be made up at a later point.**

HOMEWORK FOR SESSION 3:

- 1. Meet once with an exercise consultant and exercise twice on your own for 35 minutes each session. Record on the TLC-D Record Form.**
2. Continue to get 30 minutes of bright light exposure per day, 5 days a week, and record it on the TLC-D Record Form.
- 3. Continue to record daily mood rating, vitamin & Omega-3 use on the TLC-D Record Form.**

Session 4

- Omega 3 supplements and vitamins?
- Exercise: How'd it go with exercise consultants? Exercising independently?
- Rumination

I. Bright light exposure

A. Introduction _____

- **Direct clients to p. 19-20.**
- As we discussed in our last session, one important way that our modern environment is different from the ancient environment is in the number of hours we're actually outside. We've mentioned exercise. However, being more active isn't the only benefit to being outside more often. Let's take a minute to discuss the amount of light that we are typically exposed to over the course of the day and what impact this might have on our bodies and, therefore, on our moods as well.
- It's likely that each of you knows or has heard of someone who becomes depressed or moody during the winter, only to bounce back to a normal mood once spring comes around. More than likely, this person suffers from seasonal affective disorder. Seasonal Affective Disorder is a temporary depressive condition—not one that can flare up at any time, like Major Depression can. However, Seasonal Affective Disorder says something about the relationship between light and mood that is helpful in understanding our own mood states. Studies show that it isn't the cold or the snow, that is most closely linked to the depressed mood of Seasonal Affective Disorder sufferers. Instead, the key factor is the level of light itself: as the months get shorter, the sun doesn't climb as high in the sky, and the amount of light we get exposed to decreases. And for people who suffer from Seasonal Affective Disorder, their daily moods go downhill, too.
- But light isn't influential just for Seasonal Affective Disorder sufferers. Even a person who doesn't experience any kind of mood disorder has the general tendency to feel better on a clear, sunny day than on a dark, overcast one. Everyone has heard classmates or even ourselves say that we “just didn't feel like getting out of bed this morning” when we looked outside and saw the weather. More than likely, the weather that greeted us through the window didn't include a brightly shining sun, but a dark and foreboding sky instead. So it's normal for bright light to help our moods and for a lack of light to bring us down, regardless of whether we're burdened by any type of mood disorder.

B. Why light is so important _____

- Even people whose moods aren't responsive to bright light exposure still get benefit from it. One of the most convincing theories explaining why exposure to bright light might be important to normal human functioning has to do with the circadian rhythm. The circadian rhythm is a cycle that regulates several important bodily functions that we cannot consciously control, such as body temperature or sleeping and waking cycles. It is designed to keep our body working optimally, so that our normal routines don't become overly taxing or even hazardous to our health.
- It's not hard to imagine how risky life would have been in the ancient world if sleep would have been so irregular as to make hunting impossible: the effects could literally mean the difference between life and death.
- Since bright light is known to reset our internal clocks so that all these bodily processes follow a more-or-less 24 hour cycle, it would have been crucial for early humans to have had a regular dose of sunlight each day to ensure that they were in good health and alert over the course of the day. In the ancient environment people spent almost all their time outdoors, so they would always be there for sunrise and get their reset.
- While these bodily needs still apply to humans today, the circadian rhythm is especially important to our Lifestyle Change group because of the relationship between the circadian rhythm and depression. Many studies suggest that one contributor to depression is when the cycles of the circadian rhythm get out of sync with each other—particularly, when the cycle controlling our sleeping and waking starts too early or, more often, too late.
- Research suggests that we can readjust these cycles through exposure to bright light at focused points during the day. For those of us whose moods are responsive to light, correcting errors in these circadian rhythms should have a positive effect on our mood states. And for those of us whose moods aren't responsive, we should still see benefits in our bodily functioning when we adopt more stable circadian rhythms—keep this in the back of your minds for a few weeks for when we discuss the topic of sleep in general.

C. How do we get more light exposure? _____

- So we've been talking about the benefits of "bright light." But how do we check to see if light is truly bright or not? All of us can look at the sky and decide for ourselves if it's a bright day or a dark day. But to measure brightness of light in a scientific way is a bit less instinctive. In research, the amount of light that we are exposed to is usually measured by a unit called "lux." This unit can tell us how the light we normally are active in compares to sunlight on a clear day or sunlight on an overcast day.
- **[Refer participants to chart in worksheets]** While looking directly at the sun provides a dangerously high number of lux (about 100,000 lux, enough to cause permanent damage to your eyes), the amount of light that is directed at us from

the sky as a whole varies from over 10,000 lux on a perfectly clear day to about 1,000 lux on an overcast day. Now compare these to normal interior lighting, which normally would be at about 500 lux, depending on how close to the light source we sit or stand. While this is enough light to see, interior lighting clearly doesn't provide a level of illumination at all comparable to what our ancestors thousands of years ago must have been used to.

- Now that we have a general understanding of how to measure the strength of light, we need to determine what levels of exposure are needed for us to get benefit from it, either for our moods specifically or to readjust our circadian rhythms. To some degree, the strength of the light that we need depends on how long we're exposed to it.
- In some studies, depressive mood has been shown to diminish if the participants spent at least one hour of the day under light at 3000 lux. And research shows that the more light the better! In one study people exposing themselves to 10,000 lux showed fewer symptoms of depression than those exposing themselves to 3000 lux.
- One important guideline in bright light exposure is to be consistent. Depression seems to be affected by bright light very quickly, in some cases over the course of 24 hours. But the evidence suggests that if this exposure doesn't last for at least a few weeks, a relapse of depression is likely. Also, because we're trying to readjust our circadian rhythms with bright light exposure, we should be sure to set a time for our exposure and to stick to it.
- A good rule of thumb supported by research is the following: for those people who tend to sleep in later, exposure to bright light tends to be most effective when it's administered as soon as possible after waking up in the morning; for those people who fall asleep early, it's probably more effective to administer the bright light during the evening.
- While everyone is going to differ on the duration of exposure they need, let's set a goal of at least 30 minutes of bright light exposure each day for everyone to begin with. For those of you whose schedules permit, some of the best experimental results have come with subjects who have exposure both in the morning and in the evening. Just be sure that the 30 minutes is all at once rather than piecemeal throughout the day.

D. Practical issues with getting light exposure _____

- Some of you might choose to combine your exercise activities with your bright light exposure. Exercising outdoors would be a good way to do this, but remember not to neglect the bright light for any day that you don't exercise. Also, be sure that exercise takes place on days that aren't too cloudy or too close to sunrise or sunset. If the light isn't at least moderately bright (2500 lux), there's no guarantee that it will have any effect on mood *or* on circadian rhythm.
- If you don't plan to be outdoors nearly enough to get your 30 minutes of bright light per day, or during the winter when most of you might be in class during the

daylight hours, it is just as worthwhile to get your lighting from artificial sources. We'll be providing a light box for your use. The light box is, quite simply, a very strong light source (10,000 lux) that provides just as much illumination as you'd get on some of the clearest, brightest days outdoors. **[Take group members down to Fraser 321. Explain that they can come use it anytime the building is open. The combination to key box is 0-1-2-3]**

- You don't need to stare directly at the light source (and in fact, you probably shouldn't!) It's best if you aim the light box at you from the front and side, and you can get your 30 minutes of bright light exposure in this way, during which you can do other things like studying or reading. You need to be within two-feet of it to get the full effect. You do not, however, want to look directly at the light box. You may want to read the paper, eat a meal, or do something else while sitting in front of the box.
- How quickly should you expect to see some changes from the bright light exposure? For a few lucky people, you might find changes in the levels of your depressive mood overnight. For most, though, it takes one to two weeks before the evidence of a lower number of depressive symptoms becomes measurable. And it's not an immediate effect—the decrease of depressive symptoms often stretches for weeks. The longest studies on record tracked participants for a full month, and there was evidence at the end of the study that the participants were still improving in their symptoms little by little. Finally, remember that even if you don't find a positive mood effect, the stabilization of your circadian rhythms will offer benefits in areas apart from mood.
- Indoor light doesn't count: One little caveat about indoor light: in some ways it can be unhealthy for us. Specifically, it is just bright enough to trick our mind into thinking it is twilight. You don't get the same melatonin (natural hormone that helps your brain go into sleep mode) surge if you have your indoor lights on. Sleep hygiene people have suggested that people turn off their lights about a half an hour before you go to bed.
- Time driving or being near a window can approximate the right amount of light.

At conclusion of the session, remind patients of homework, and that the therapists will be calling them at some point during the week to do a check-in.

HOMEWORK FOR SESSION 4:

- 1. Continue to meet once with an exercise consultant and exercise twice on your own for 35 minutes each session. Record on the TLC-D Record Form.**
2. Get 30 minutes of bright light exposure per day, 5 days a week, and record it on the TLC-D Record Form.
- 3. Continue to record daily mood rating, vitamin & Omega-3 use on the TLC-D Record Form.**

Session 5

I. Homework:

- Rumination: Review strategies?
- Omega 3 supplements and vitamins?
- Light therapy: bright light exposure?
- Exercise: How'd it go with exercise consultants? Exercising independently?

II. Social Support

A. The importance of social support _____

- **Direct clients to p. 22.**
- Social activities that are fun, positive and pleasurable. But maybe you don't do anything social outside of going to class.
- Also, have you ever noticed when you seem to feel the most sad? [**Clients indicate things like “at night”, “after I get home from class”**] So the thing that these seem to have in common, is that they are times when you are alone. Do you all agree with that? [**Clients indicate that they do, HOPEFULLY!!**]
- Actually, a lot of depressed people say that they feel the worst when they are by themselves. So it seems that besides preventing rumination like we just talked about, being around other people also improves our mood. It makes us feel better.
- Being around people is also a support network- people that can help us feel better. But many people, when depressed, feel they are a burden to others, or feel they must prioritize work and school over all pleasant activities, including socializing. Must recover from depression before can function effectively at school or work, and social support is an integral part of this recovery.
- Research by Brown and Harris: People with major loss events who didn't have rich social support networks were more vulnerable to depression.

B. The ancestral environment connection _____

- We've also talked about all the differences between our modern lifestyle and that of our ancestors. Our ancestors generally lived in tiny villages with all their extended family close by. How many of you still live in the same town as your parents? (Participants answer not many) Right, and even if you do, you probably have had other friends and family members leave to go somewhere else. Our ancestors spent their days hunting and gathering with friends and family, and during their evenings they were surrounded by loved ones as well. They didn't

- have any time when they were alone at all. Because spending time with others is so crucial to our mood, and because many of us don't do it enough, we'd like to help you find ways to make more social contacts and get you to engage in more social activities.
- Let's start by identifying our major social contacts. Please turn to page ___ and let's think about who the most important people in our lives right now are. There are two different sets of blanks here.
 - First, let's think about people that are important to us that are far away: family or friends who you've moved away from or have moved away from you. It's so hard to be separated from them; does it help to touch base by phone and talk for half an hour or an hour? Is there anyone who you think it would be helpful to re-initiate contact with?
 - Second, think about who lives around here that we spend time with? If there's no one around here that you talk to regularly, can you think of someone who you know well enough to make a plan to hang out with?
 - If there's no one around here at all, just think about some ways to enhance feelings of connectedness with people who are around you. Or someone living on your hall who you've never spent time with that you'd feel comfortable inviting to a movie or coffee?
 - Okay, now that we have thought of some people to spend time with, let's all write down three examples of social activities that we like to do. This could be exercising, watching a movie, going out to dinner, studying together, whatever. [Help clients identify 3 specific examples of social activities they have found/would find enjoyable (will they be able to do this when depressed? Maybe provide a list of examples for them to work off of?)]

[Therapist(s) help(s) clients come up with specific HW assignment for the following week that incorporates the above elements of 1) initiating contact with a loved one who lives far away and 2) doing a social activity with one of their identified social contacts]

Homework for Session 5

- 1. Initiate contact with a loved one who lives far away and plan a social activity with another social contact.**
- 2. Continue with supplements, anti-rumination strategies, bright light, exercise.**

Session 6

I. Homework:

- Social Activities
- Rumination: Review strategies?
- Omega 3 supplements and vitamins?
- Light therapy: bright light exposure? Update on light box?
- Exercise: How'd it go with exercise consultants? Exercising independently?

II. Sleep Habits

A. Practicing better Sleep Habits _____

- **Direct clients to p. 22.**
- Getting adequate restful sleep is really important in keeping your mood elevated. In fact, lots of research has shown that when we don't get enough sleep we tend to feel more down the next day. Have you experienced this? Do you notice that you feel particularly down when you got really poor sleep the night before? Or maybe you've noticed that your mood seems good on days when you are really rested? **[Encourage participants to share any experiences with mood and sleep that they have noticed].**
- If you have moments of drowsiness at any point in the day, that's your biggest indication that you aren't getting enough sleep.
- How about the standard "8 hours" rule? How many of you have heard about the "8 hour" rule? **[If a group participant feels confident, they could explain the rule. Otherwise, a group leader can explain the 8 hour rule: *The 8 hour rule is the idea that on average people need 8 hours of sleep per night to be well-rested*].** Of course, people vary widely and some people will need more or less than 8, but on average, experts recommend 8 hours.
- The problem is that most of us don't get 8 hours of sleep per night. Our lifestyles have gotten so chaotic and busy. Some people have long commutes that require them to wake up very early and many of us stay up late watching TV or surfing the internet. In fact, in the last 100 years, the average hours of sleep people get in developed countries like the U.S. have decreased from 9 hours to 7.5 hours per night. On average we are sleeping an hour and a half less per night than we did 100 years ago! That's 10 and a half fewer hours of sleep every week than people were getting just 2-3 generations ago.
- If we think back 100 years or even further, it makes sense. People didn't have TV to watch at night. There wasn't electricity so many people just went to bed when it got dark. This is similar to what it was like in ancient times. People went to bed earlier because there weren't all the distractions to do after dark that we have now. In the ancestral environment, as recently as 150 years ago, nobody had

interior lighting and people's lives were naturally attuned to the world around them.

- Have any of you been camping for a few days? Long enough that your body starts to get in tuned to the environment? Do you find that it starts to be hard to stay up long after the sun goes down? **[Participants could share these experiences if they have any]**. Firstly, there isn't as much stimulation going on, but also, your brain is actually wired to detect dusk, its wired to detect this gradual dimming of light, and at that time you get this huge surge of melatonin, which is like a natural somnolent, something that naturally makes us feel drowsy. If you go to bed at the same time every night you start to notice that about half an hour before you are used to going to bed you get this wave of drowsiness, and that wave is just the melatonin hitting you.
- How do you know if you're getting enough sleep? One thing that I found very useful is to think for yourself, if you want to know if you are getting enough sleep, ask yourself if you've ever found yourself in a moment where not much is going on, a boring class, a boring lecture, where you were very understimulated, do you find yourself getting drowsy. Here's the interesting thing, boring events do not make people sleepy, all they do is unmask the drowsiness that has been there all along. When you're sleep deprived you can mask that sleepiness through two ways, one of which is through stimulants, like caffeine, the other way is to keep ourselves immersed in really stimulating activities.
- Because we get so distracted by TV programs, the internet and a variety of other things nowadays, we are preventing ourselves from getting enough sleep—we get wrapped up in these things and end up staying up very late. Our bodies are biologically programmed to get sleepy when it gets dark but we fight off our sleepiness because we are engaged in these activities we are doing.
- So now that we've talked about the importance of good sleep habits in elevating mood, we want to give you some tips for improving the quality and if possible, the quantity of sleep you are getting. *What you need is a quiet mind and a tired body.*

B. Things patients are already working on to improve sleep: _____

- Actually, the good news is you are already starting to do some things that can help improve your sleep! One of the most important things you can do is get into a regular exercise routine. People who are physically fit tend to have a better quality of sleep. Since last week we started getting you to develop your own exercise routines, you are already on the right track in that aspect. One important thing to remember is that exercise can help you to sleep better but you don't want to do it too closely to when you will be trying to go to bed. Exercise wakes up us initially—so you should try to exercise at least 4 hours before you will want to go to sleep.
- Another thing you are already working on is incorporating bright light exposure into your daily schedule. As mentioned a few weeks ago, establishing a routine of

bright light exposure should help stabilize your sleep-wake cycle so you start to feel sleepy at the same time every night.

- Also, many people taking Omega-3 supplements have reported sleeping more soundly as well. So that is another thing that you are already working on.
- But we also want to give you some pointers on other things you can do to improve your sleep. **[At this point, distribute a handout with the pointers you are going to talk about listed and divided into sleep quantity and quality]**

1. You need to get your body ready to go to bed—to help yourself start to get sleepy. Think about trying to put a 2-year-old to bed. You can't just jump in in the middle of a crazy game of chase and get them to go straight to bed. You have to set up the environment in terms of cues: put on pajamas, wash up, turn off the lights, read a quiet story.

With adults it's the same. You should turn down the thermostat by a few degrees. Most people report sleeping better when it's cooler, and this makes sense when you think about the conditions that our ancestors were used to sleeping in. You also need to cut out bright lights about an hour before you want to go to bed. One idea is to read a book—either a fun book or a school book--under dim light. Or take a warm relaxing bath with the lights dimmed. These are both relaxing activities that don't require bright light. Any other ideas for activities? **[listen to relaxing music, shower, etc.]**. Hopefully by doing this, you can increase the quantity of sleep you get because it will make it easier for you to fall asleep when you want to.

2. This actually raises another issue. One of the biggest problems people have when they are trying to fall asleep is that they get impatient and upset if they can't fall asleep when they want to. Then they worry about how tired they are going to be tomorrow and so on. . . in a sense it is like they are ruminating about not sleeping. Have any of you had this happen? **[Allow participants to share their experiences]** So the important thing to remember is not to go lie down and try to sleep if you don't feel tired. And if you do think you are tired, and you go lie in bed for awhile and can't fall asleep, then get back up and do something quiet and relaxing—like reading a book again—until you are tired. But try not to worry and worry and worry about not sleeping. Because this just makes it more difficult to fall asleep.

Also, if you have trouble sleeping you should not spend time in bed when you are not tired or doing other things in bed like reading, eating and watching TV. You should try to keep your bed a place where you sleep and maybe have sex, and that's it! That way your body learns that it's time to sleep when you get into bed.

3. Another idea for increasing sleep quantity is to try and keep a regular sleep-wake schedule. You've probably heard this before. It is one of the most common suggestions for making it easier to fall asleep. This means going to bed at the same time each night and getting up at a similar time each morning and it also means not taking naps during the day. This way your body can get into a pattern. We know this can be very hard to do in college—but it can really make a difference. What do you all think? It's pretty difficult to wake yourself up early on days when you have time to sleep in, right? **[Give participants a chance to answer]**. But if

you can get into a regular routine, it gets easier. Maybe plan on doing your exercise routine in the mornings that your don't have class until later. . . or getting your homework done so you can do something fun after class. And once you get you waking up and going to bed more regular, you will probably be less likely to want to take naps.

4. Some of the other things we wanted to mention are probably things you have noticed on your own. One common one is drinking caffeine—most of us have heard that drinking caffeine makes it difficult to fall asleep. So you want to avoid coffee and sodas close to when you will be going to sleep. However, sometimes people don't realize all the things that are caffeinated—chocolate and some energy drinks are some examples that a lot of people don't know about. So it is important to be aware of the things you eat and drink near bedtime and read the labels if you think there is a chance they have caffeine. Also, for some people caffeine can disrupt sleep habits even if not consumed near to bedtime. This is especially true for people who drink multiple cups of coffee per day or lots of caffeinated sodas. If you do consume a lot of these drinks in one day, you might want to try cutting them back.

5. This kinda leads into the next point—another thing some of you may have noticed on your own. It's not good to go to bed when you are really hungry because you might wake up feeling hungry in the middle of the night. However, you don't want to go to bed really full either because you won't sleep soundly. The best thing to do if you are hungry before bedtime is eat a light snack. Does anybody have suggestions for good bedtime snacks? **[See if participants offer good “light” bedtime snack ideas. If not, group leaders can offer some suggestions. One idea that is nice for people who like to drink something warm and soothing before bed is the sleepy time tea—it is de-caffeinated and makes a nice bedtime snack].**

6. Another important thing in sleep quality is alcohol use—and sometimes there is a kind of myth associated with alcohol and sleepiness. Many people think that drinking alcohol helps them to sleep. Have you all heard about this anywhere? **[Allow participants to answer].** In fact, sometimes alcohol does help us to fall asleep because it makes us drowsy, but when the effect of the alcohol starts to wear off, it can actually make us restless and cause us to wake up. Sometimes we might have to wake up because alcohol dehydrates us and makes us thirsty or because alcohol makes us have to pee more frequently. Basically, it makes the quality of our sleep poor. So it is best to avoid drinking a lot of alcohol before bedtime, and even to avoid alcohol altogether within 4 hours of bedtime.

- A lot of you have mentioned napping during the day. If you have trouble sleeping at night, this is not a good idea. For insomniacs, fatigue is your friend. You want to be really exhausted by the time you go to sleep.
- Some people get woken up in the middle of the night by roommates, pets, other noises. You may want to consider wearing ear plugs to bed or having a white noise machine to block out all the extraneous noises.
- Sleep deprivation is also one of the biggest most reliable triggers for the recurrence of depression after people have fully recovered, so it's important to make sure you consistently get good sleep.

- We've given you a lot of suggestions on how to improve sleep quantity and/or the quality today. And we sure don't expect that you are going to be able to do all of these things. We don't do all of these things! But we gave you a variety so you can pick and choose the things that work for you. *Is there anything that we want to emphasize as the most important out of the ideas we have given?* We hope that by doing some of these you will be able to improve your sleep hygiene.

At conclusion of the session, remind patients of homework, and that the therapists will be calling them at some point during the week to do a check-in.

Homework

- 1. Think about which sleep strategies might be most helpful for you. Try them out and see if they make a difference.**
- 2. Continue recording your other activities on the Weekly Record Form.**

Session 7

I. Homework

- Sleep strategies: what did you use? What was effective? Compare sleep before and after.
- Rumination and anti-rumination strategies
- Exercise
- Omega-3 & Light therapy

II. Socialization Part II: The role of self-esteem

A. Global village threatens self-esteem _____

- **Direct clients to p. 26-29.**
- Let's revisit, for a moment, the social structure of human life in the past. The typical village or clan of our ancestors had only 50-200 people living in it. And thousands of years ago, cities and large population centers were completely unheard of. Nowadays there are over 6 billion of us, mostly living in big cities. Even those of us in smaller communities consider ourselves part of a huge, "global village".
- One of the implications of these facts is that humans were originally made to function in small social groups, often in groups of a few dozen individuals, but now our bodies and minds are being asked to perform not with a small-group perspective but with a large-group perspective.
- With this shift in perspective comes a shift in how humans perceive and evaluate themselves. Back in the village, everyone had his or her role, because the jobs needed for the group's survival couldn't be outsourced to others. For most of human history, a person's entire social world was at most 200 people; in a group that size it's inevitable that you would actually be the best or among the best of all the people that you knew, at a few different things. Maybe several different things. Isn't that interesting? All of you know lots of people your own age, but in the clans of the ancestral environment, there might have only been say 4 people at your age group. Maybe 5, maybe 6, and out of all the people in your peer group where you compare yourself, you'd say wow, look at _____, he's the one who can take a stone and knock it out of a tree from 150 yards. He's just the man that can do that! And _____, she has this knack for identifying edible berries and knowing how to pick them.
- We can speculate that, as a result of the jobs that people performed, all the members of the village would quickly learn who was the best hunter, who was the most adept at caring for and teaching the young, who was the best storyteller, and who did the best at a variety of other roles. Evidence suggests that early social groups did establish hierarchies and held certain jobs in higher respect than others; nevertheless, it's not hard to see that, just given the small number of people trying to survive in an environment of incredible diversity and a strong

- tendency toward change, it wouldn't have been too difficult for individuals to carve out important social niches for themselves to occupy. In short, everyone would have been "the best" at something or other.
- And now think about the fact that we live on a planet with 6 billion people, connected in this global village by instantaneous mass media communication. And, the way our brains work is so bizarre. We see people on TV, say Brad Pitt, and Jennifer Aniston, and we hear about their break up. And it's almost as if they're part of our village. And we attend to it as if we know them, as if it somehow affects us. We actually seem to internalize and incorporate every single person that we're presented by the media as part of our village, since we think we see them on a regular basis.
 - Now think about what that does to our sense of uniqueness. If we're in a village of 6 billion people the chances are overwhelming that we're not going to feel like we're the best at anything. Does that make sense? In other words, every little village might have its own equivalent of Michael Jordan, or Albert Einstein, and relative to the rest of the group they are. Maybe they're the smartest at math, or the most athletic. But then they compare themselves on the global scale, and the chance of feeling unique or special is really reduced to some extent.

B. Exercise: Important social roles _____

- To illustrate this point, let's take a survey about what aspects of our lives are important to us. I'd like it if someone can give me one or two activities that they do or characteristics that they have that are important to how they regard themselves. I'll go first: My [role] is important to how I feel about myself. **[Write the role selected on the board or overhead.]** What I mean by this is that, if I feel I'm a good [role], I'm more likely to feel good about myself as a person, whereas if I decide I'm not a good [role], I'm more likely to get down on myself as a person. This characteristic would be part of what we'd call a self-concept: the set of aspects we use to develop an idea of ourselves. Let's hear what's important about how you regard yourselves—what aspects are the most influential to your self-concepts.

[The therapist now conducts a brainstorming session, soliciting input from group members. It may be helpful on the rarer suggestions to clarify with the contributing group member how, exactly, that changes in that role or characteristic affect how it affects his or her self-esteem.]

- Often, when these roles or aspects of ourselves are threatened, we risk valuing ourselves less—we risk developing low self-esteem. This might happen when we compare ourselves to others who we perceive to be "better" than ourselves in these roles or aspects. Or, this might occur when we get feedback about ourselves that suggests that we aren't as good at these roles or aspects as we thought we were. For someone valuing his academic abilities, for example, the role of "good student" might be threatened when a brilliant new student enters the class or when an exam is returned with a bad grade on it. Suddenly, someone who put a lot of

importance into that “good student” role is left with some evidence that he or she isn’t as “good” as originally thought. As a result, threats and challenges cause us to no longer have a solid feeling of who we are, and we might begin to suspect that other parts of ourselves that we value aren’t as special as we really thought that

- What does any of this have to do with depression? As I’m sure you’ve already guessed, individuals who suffer from depression often have low self-esteem as well. This probably isn’t too surprising—when we feel good about ourselves, it’s a lot easier to feel good about things in general, and when we feel poorly about things in general, it’s more than likely that we tend to focus on the negative aspects of ourselves—the parts of our self-concept that are going badly—rather than to realize that there are parts of our self-concept that are still going well. When we talked about “rumination,” we talked about how depression is like having to wear a pair of dark-tinted glasses. That’s just as true referring to how we see *ourselves* as it was when we were talking about how we see the world as a whole.
- We can learn from people who don’t suffer from depression. People who are more resistant to depression tend to have more aspects and roles in their self-concepts than do people who experience depressive episodes. As a result, when the self-concept of a non-depressed person is threatened, they have other aspects and roles to fall back on—getting a bad grade might threaten the role of “good student,” but it doesn’t mean that the person is also a poor boyfriend/girlfriend or a poor musician. Non-depressed people are remarkable good at forming these other roles and attributes to act as back-ups should other roles be threatened, thereby maintaining high self-esteem.
- People who suffer from depression, on the other hand, tend to have fewer important roles and aspects contributing to their self-esteem. When even a single role is threatened, their entire self-esteem might plummet. Part of this phenomenon may result when people who suffer from depression overvalue the aspects of the self-concept that are being threatened. In the ancestral environment, overvaluation of a role wouldn’t have been a problem, since nothing would have been likely to happen that would threaten each member’s roles. There were so many roles to have, each member of the village would have been likely to truly have been the best at some things—so evidence to the contrary would have been rare in that environment. Today, though, we’re constantly bombarded by new ways to evaluate our performance, and society also has a bad habit of redefining what is supposedly desirable and undesirable without any warning. So, if an important role gets threatened and we have been overvaluing its importance, we tend to focus on this blockage and tend to ignore other roles that we could fall back on. This is simply another way of conceptualizing rumination, which we’ve already talked about.

C. Generalization of negative emotion/ Rumination _____

- One other phenomenon that is common among people suffering from depression is that they tend to generalize from a single threat. Back to the example of a non-depressed person who gets a bad grade: this person might conclude that he's no longer a great student, but the threat seems to stop there. It doesn't bleed over onto unrelated roles and attributes. With depression, though, we tend to see the opposite happen. When one role is threatened, the effects are far-reaching, and suddenly everything is seen in a negative light. So, for many people suffering from depression, fairly limited negative feedback, like a bad grade, might be interpreted as reflecting catastrophic failures in *all* roles and attributes. This is another part of rumination—when one starts to focus on negative thoughts about a single aspect of oneself, other roles and aspects suddenly start to be considered in a negative light, too.
- Exercise: To fight this tendency, we should work on understanding that each of us has a self-concept that's probably a lot more complex and multifaceted than each of us realizes. Let's spend the next few minutes continuing our earlier exercise and make a list of what aspects are important to our self-concepts. We'll set a goal of five aspects for each of us. We'll help each other if anyone gets stuck.

[The therapist now gives the group several minutes to work on their lists. For group members who spend so much time on school or on a job that it is largely unreasonable to expect them to have important roles beyond these, it is permissible to divide these roles into sub-roles. For example, in the case of a heavily-worked student, the exercise can be made useful by partitioning the self-concept into different school-related roles: e.g., good laboratory partner, thorough reader, competent test-taker, and attentive note-taker. In such a case, it is worthwhile to review with the group how even such a partitioning of a role protects the individual from making generalized negative self-evaluations when a single sub-role is threatened. This partitioning technique should also be demonstrated for individuals who get stuck on the task by fixating on only one or two aspects or roles.]

- Is anyone willing to share his or her list with the rest of the group? **[The therapist solicits a group member to read his or her list. After hearing the entire list, the therapist selects one of the aspects or roles and then hypothesizes an event that would threaten that role.]** So, what would happen if [hypothesized event] were to threaten his/her self-concept? Does it mean that all aspects of his self-concept are in danger of being lost? Does he/she still have other characteristics that allow him to maintain high self-esteem? **[The therapist now leads the group on a discussion of how the group member would be able to focus on his non-threatened aspects and roles and to participate in activities that draw on these strengths in order to maintain positive self-esteem.]**

- So what we just showed is that every one of us has a lot of characteristics that serve as back-up when life events threaten us in some way. When one of our roles doesn't seem to be serving us well, we still have others that affirm that we are good, competent people.
- D. Social Self-support: 3 things _____
- Referring back to our example of the ancestral environment, it would have been easy to take credit for what went well—within the small village group, the person who could do a job the best naturally was the one who could feel entitled to taking credit for accomplishments in his or her role. We often forget this nowadays and feel like we need some sort of permission to take credit when good things happen. But this should be a natural part of our mentality, because we are designed to think that we are responsible for successes occurring with respect to our roles. Let's take a moment to go around the room and come up with something that we can give ourselves permission to be proud of doing. **[Group members share their successes. The therapist should encourage them to explicitly give themselves permission to take credit for the event: “I can give myself credit for . . .” or “I can feel proud because I]**
 - The take-home message about self-esteem is that the modern lifestyle is such that it's often difficult for us to maintain a positive valuation of ourselves. The size of the world, its talent pool, and constant social comparisons are things that we weren't originally equipped to deal with and which now get in the way of believing in our successful role-achievement. We need to take a step back away from our modern environment and understand that it's perfectly appropriate to take credit when credit is due. Likewise, we should remember that a threat to a single role shouldn't be interpreted as a threat to all roles—we can still value some parts of our self-concepts even if other parts seem shaky at times. *Over the course of the next week, I'd like you each to record 3 things that you can give yourself credit for each day.* Additionally, if one of your roles becomes threatened, I'd like you to take note of it and come up with a few external attributions to explain why the threat occurred. This is something we are going to ask you to do for the next several weeks. The reason is that initially people often report that they have a hard time thinking of things. This is the depression talking! People without depression automatically think of things to feel proud of. By forcing yourself to do this every day, you'll relearn this habit. After it becomes second nature again, you don't have to write them down, but to begin with, we want you to actually record them.
 - **Optional: In answer to participants who have problems thinking of anything:** When you're in a negative mood state it's a lot easier to think negative thoughts. And it's a lot harder to think positive thoughts and give yourself credit for the things you have done. There is a very common disconnect with depression where you know you should feel good about something, but it's hard to get your feelings to match what you are thinking. You just aren't feeling as if you deserve credit.

Even sometimes it just isn't as much, you just aren't feeling like you deserve it as much.

Before closing, mention homework!

HOMEWORK FOR SESSION 7:

- 1. On your weekly record forms, record light exposure, exercise, Omega-3 use, hours of sleep, and whether you engaged in a pleasant activity.**
- 2. Also choose 3 things to give yourself credit for each day and record them.**

Session 8

- This session will be a little different from what we've done before. What we want to do this week is take a break from introducing new material, and make sure that everyone is getting what we've done so far. We want to touch on each element of the treatment so far and make sure everyone has been able to follow it and hasn't run into any problems. After this session, we'll go back to the old format of doing a brief rundown of how everyone's doing and then introducing a new technique for battling depression. So far, we've asked you to make changes in each of the following areas (**write on board**):
 1. Omega-3 & multivitamin
 2. Anti-rumination strategies
 3. Exercise
 4. Light exposure
 5. Sleep hygiene
 6. Social contacts
- Before reviewing the 6 elements, you may want to review the Social Self-support "3 things" assignment. Or you may leave time to cover it at the end. Either way, make sure you get to it, because patients often need some help with this assignment.
- This is a lot of ground to cover, and we'd like to make sure we hear from each of you whether you've been able to make this change, if not, why not, and whether you think it has led to any improvement in depression for you. So let's try to make sure everyone gets a chance to talk about their experience in each area, and then we'll spend any remaining time talking more generally about how everyone's weeks were.

At conclusion of the session, remind patients that the therapists will be calling them at some point during the week to do a check-in.

HOMEWORK FOR SESSION 8:

1. **On your weekly record forms, record light exposure, exercise, Omega-3 use, hours of sleep, and whether you engaged in a pleasant activity.**
 2. Also choose 3 things to give yourself credit for each day and record them.

Session 9

I. Review of homework (In order of priority)

1. Social contacts
2. Self-esteem: giving yourself credit
3. Exercise
4. Anti-rumination strategies
5. Light exposure
6. Omega-3 & multivitamin
7. Sleep hygiene

II. Behavioral Activation Part II: Flow

A. Definition of flow _____

- **Direct clients to worksheet on p. 31.**
- We talked about how different activities can distract you from rumination and help lift your mood. But not all activities are equally effective at doing this. Certain things just aren't engaging enough, like TV, or they lift your mood while you do them, but then you don't feel good about yourself afterwards, like eating junk food, or sleeping. Today we're going to focus on a class of activities known as flow activities, which make people both feel really good while they're doing them, and leave a lasting positive impression!
- Have you ever heard a sports star refer to "being in the zone", where they felt like everything could be done easily and that they felt that they had a moment of great physical and/or mental clarity? While athletes call it being "in the zone," those in the field of psychology often refer to it as engaging in "flow". Today we will try to explain to you just exactly what flow is, and how you can achieve it.
- **[Refer participants to the list of characteristics of flow in their worksheets]** Flow describes a state of mind where one is *focused and concentrating*, yet experiencing pleasure and excitement. When people are experiencing flow they tend to feel great inner clarity and forget their daily worries. Flow occurs when the mind is engaging in an activity that is neither too hard nor too boring, but at an optimal level of concentration, where an activity is doable, but also challenging.
- Another important characteristic of flow is that the activity has a *clear set of goals and a clear set of strategies to reach that goal*. A good example of this is painting. The goal may be to create a picture. The responses to that goal would be making the brush movements that comprise the final product.
- Another important thing about flow is that it *provides immediate feedback* on how well you are doing. For example, say you are going on a run to a friend's house or have decided to hike a mountain trail. You know where you started

and you know what the end is going to be in both cases, thus you can immediately tell how well you are doing. A lot of our modern daily activities are not set up like this to provide immediate feedback. I'm sure that everyone can think of a paper or project that they spent several sessions trying to complete without any indication of how well you were doing and remember how it feels to not be able to gauge your performance immediately.

- Our modern society has structured itself in a way where people feel like they must constantly be working on long-term goals and postpone immediate gratification. Our ancestral environment was not set up in such a way. Our ancestral environment allowed for immediate feedback. Activities were doable yet challenging, such as hunting, preparing food, making clothing and finding shelter.
- Now let's brainstorm some activities that could be considered flow activities. Keep in mind that your homework assignment will be to engage in a flow activity and think about ones that would be possible for you to engage in, or that you used to enjoy doing. **[Write the participants' suggestions on the board.]**
 - Examples include: Painting or any artistic activity, gardening, running or any athletic activity, playing poker, knitting, video games, various hobbies
 - **[Let them know that TV is not considered a flow activity. If someone names it, explain the following. If it doesn't come up during brainstorming, bring it up at some later point.]**
- So now is also a good time to explain why TV is not considered flow. Although you may think that TV is relaxing and could fall into the criteria we have mentioned earlier, research shows that people do not get the flow-related benefits from watching TV and actually may have the opposite effect. TV is also not considered flow because flow is not just spacing out or not thinking. To be engaged in flow is to remain active and involved in the activity.

B. Incorporating flow into daily life _____

- So now that you know a lot more about what flow is, let's focus on how you go about working on incorporating flow into your daily life. The first step is to pick something that you really enjoy or used to enjoy and also allows you to experience the criteria we have listed on the board for what a flow activity consists of. The next step is to consciously and intentionally seek out time for this activity. Noting how to categorize the time you spend doing various life activities most easily does this.
- Let's break up our day into 3 main categories: Productivity, Maintenance, and Leisure.
 - Productivity: working, studying
 - Maintenance: house work, personal care (grooming), eating, driving
 - Leisure: anything you do for fun

Activities at any point during the day can fall into two basic categories:

- Passive: media consumption, resting, basic socializing (small talk)
- Active: doing a hobby, exercise, playing a musical instrument
- Flow is most likely to occur in the active leisure category. But it can also occur in the productivity or maintenance category as long as the specific activity fits the criteria and is enjoyed. For example, someone's occupation could be to knit sweaters. As long as they fit the criteria than they are engaging in flow.
- Research has shown that although people tend to get the most enjoyment out of active leisure, more time is spent in passive leisure doing things like watching TV and other passive media consumption.
- So why is it that if people get more enjoyment out of active leisure that they still spend more time in passive leisure? The problem is that before you can involve yourself in active leisure there is usually some sort of preparation time involved. For example, before you go for a walk or go play basketball you may have to spend a few minutes getting dressed or maybe even drive to a different location. So initially it is much easier to engage in passive leisure, but the small amount of effort that you put into active leisure will really pay off in the end.
- Another important step in using and improving the use of flow is to pay attention to what you do throughout the day. Take note of how you feel before, during, and after certain activities. This way you can begin to fill time in your day with more flow-full activities or remove activities that you don't get as much pleasure from and replace them with flow-inducing activities.

HOMEWORK FOR SESSION 9:

- 1. Pick a couple of flow activities and make a point of engaging in at least one of them during the week. Record it on the weekly record form along with the things you've been recording all along.**
- 2. Make sure to record 3 things each day that you can give yourself credit for.**

Session 10: Relapse Prevention Part 1

Remember to have Weekly Record Forms for the next 2 weeks available!

I. Lifetime Change

- At this point, many of you have worked really hard and significantly reduced the severity of your depressive symptoms. We have given all of you copies of your BDI, the measure you filled out each week. You can look back through those to see what your scores were when you first started coming to group and what they are now. In this group we've seen an average of more than ____% reduction in symptoms. Now, the trick is keeping up these gains that you've made, and hopefully extending them even further over the coming weeks. Our next session will be in 2 weeks, on _____ (fill in date). Between now and then we want you to concentrate on trouble-shooting any areas where you're still having problems, and think about how to keep these changes up for a lifetime.
- That's the bottom line of course. These strategies that you've learned in here only work if you keep them up consistently. Think of depression as an illness like diabetes that has to be managed. People with diabetes can lead long, healthy lives if they plan their meals, exercise regularly, and use insulin therapy. However, if they do not use these lifestyle strategies, they may suffer serious consequences. Depression is the same way; it is a disease that needs to be managed through permanent lifestyle change. People who have had depression once are likely to have a relapse again, IF they do not continue to actively manage their condition through lifestyle change.
- These groups are brand-new, but we developed this treatment on patients in our individual practices. I had one patient who had been getting depressed reliably twice a year. After she began using the TLC strategies, she was able to keep them up successfully. She took up running and walking outside in the sun and stuck with them as faithfully as a patient with diabetes takes their insulin. She takes fish oil every day, and has made a point of making social activities a regular part of her life: she has a weekly walking date with a friend and started hanging out regularly with a group of work colleagues. She is now in her third year of being depression-free. But it is because she has been hypervigilant about keeping up her lifestyle changes!
- And not to sound too scary, but I had a patient who had the opposite experience. He experienced occasional bouts of depression that would last a month or two, at least three or four times a year. After starting to exercise, socialize more, and take fish oil, he had been free of depression for six months and felt good enough to discontinue therapy. Six months later, he was back, reporting that his depression had returned. The first thing I asked him was was he still on the fish oil and exercising regularly. He told me he had quit the fish oil because he was feeling so good he didn't need it. His schedule had gotten busy and he had fallen out of the

- habit of exercising regularly. He had had a setback in school and before he knew it, had fallen into depression again. It's so easy to think that just because you are feeling better you have permanently beaten depression and don't need to worry about keeping up the habits that have helped you to feel better.
- It's a difference that we sometimes notice is particularly pronounced according to how long someone has suffered from depression. The first patient we mentioned, the female, was in her 30s and had had depression since adolescence. After trying basically every antidepressant in the book with limited success, she was very determined to stick with a program that worked. The second patient, the male, was only 20, and hadn't realized the chronicity of his depression yet. He hadn't learned firsthand that there is a really good chance depression will come back if you don't take any precautions against it.
 - So what we want to talk about tonight are strategies to keep these changes up.
 - The things we have gone over in this group need to be thought of as lifestyle changes that you keep up forever.

II. Tips for sustaining changes: (Lead a discussion in which leaders guide group members to come up with all of the following things. Direct clients to p. 34-35)

Fish oil: _____

- Keep a backup bottle on hand at all times so you don't run out.
- Have a consistent visual cue to remind you to take it. A sign on the bathroom window? On the refrigerator?

Exercise: _____

- If you have to break your routine, start again ASAP. Examples of this include: relocation, medical events, and travel. The more established the routine, the less likely it is that these types of things will throw you off course.
- Find an accountability partner- someone to work out with or at least encourage you to keep it up.

Light exposure: _____

- Look for ways to integrate light exposure into your daily routine. You could read the morning paper outside, study outside, or take a walk every day outside.
- Remember- you'll get more bright light benefit if you don't wear sunglasses!
- If you have noticed that you are someone who gets a big boost from bright light exposure, see if you can buy a light box. You can get a good one for about \$170 at www.Lighttherapyproducts.com

Rumination: _____

- Limit the time you spend alone- this is the time you are most likely to ruminate.
- Now that you know what it is, make sure you stay on the lookout for it for the rest of your life.

- If you notice rumination, use one of the strategies that have proven helpful during the course of this group. The top three were:

1. _____

2. _____

3. _____

Sleep: _____

- Maintain a regular schedule that allows you to get 8 hours of sleep per night.
- Remember, chronic sleep deprivation is a major risk factor for depression relapse.

Social Contact: _____

- Have as many social contacts as possible.
- Schedule things that you do regularly with people, like a weekly coffee or movie date, or a morning walk.

At conclusion of the session, remind patients that the therapists will be calling them at some point during the week to do a check-in.

Session 11 (2 weeks after Session 10): Review of material

Remember to have Weekly record forms for the next 3 weeks available!

This week you will also need to schedule Hamiltons for Session 12. Have a list of times that HRSD interviewers are available and ask participants to sign up for a time. Give preference to those who are not local.

This session, therapists should go through each of the changes and homework assignments from the past week and ensure that patients are still following them. If problems are uncovered, therapists should encourage group to troubleshoot and provide support for the patient having trouble.

Before closing, mention homework, and that the following week they will need to take the Hamilton. You should have them sign up for times to take it.

At conclusion of the session, remind patients that the therapists will be calling them at some point during the week to do a check-in. Remind them in the check-in call that they will take Hamiltons.

Session 12 (3 weeks after Session 11)

Bring a list of times that therapists are available to meet for individual 50-minute sessions so that participants can sign up for times.

I. Homework _____

- Focusing on the following areas, go around the group and discuss how it's been the past 3 weeks.
 - Rumination
 - Exercise
 - Light Exposure
 - Omega 3/ multivitamin
 - Social activities
 - Sleep hygiene
- Review the following relapse prevention strategies from Week 10 as necessary throughout discussion.

III. Follow-up procedures _____

- Have 3 month appt scheduled: Let participants know when it is.
- We'll call you and remind you.
- Feel free to contact us at any point before then if you need to talk, a different referral, whatever.
- Have list of times when therapists are available, have them fill them in

IV. Closing ritual _____

- Reflect on one or two things that have been most useful to you.
- What has this group meant to you?