Special Article

TRANCEFORMATIONS: HYPNOSIS IN BRAIN AND BODY

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In this review, the role of hypnosis and related psychotherapeutic techniques are discussed in relation to the anxiety disorders. In particular, anxiety is addressed as a special form of mind/body problem involving reverberating interaction between mental and physical distress. The history of hypnosis as a therapeutic discipline is reviewed, after which neurobiological evidence of the effect of hypnosis on modulation of perception in the brain. Specific brain regions involved in hypnosis are reviewed, notably the dorsal anterior cingulate gyrus and the dorsolateral prefrontal cortex. The importance of hypnotizability as a trait, stable variability in hypnotic responsiveness, is discussed. Analogies between the hypnotic state and dissociative reactions to trauma are presented, and the uses of hypnosis in treating posttraumatic stress disorder, stressful situations, and phobias as well as outcome data are reviewed. Effects of hypnosis on control of somatic processes are discussed, and then effects of psychosocial support involving Supportive–Expressive Group Therapy and hypnosis on survival time for cancer patients are evaluated. The evidence indicates an important role for hypnosis in managing anxiety disorders and anxiety related to medical illness. Depression and Anxiety 30:342–352, 2013. © 2013 Wiley Periodicals, Inc.

HYPNOTIC HISTORY

Hypnosis is the first Western conception of a psychotherapy, the first time a talking interaction between a doctor and a patient was thought to have therapeutic potential.[1] Hypnosis has been used as an adjunctive tool in the treatment of traumatic experiences, pain, and anxiety for more than 200 years. Initial uses involved hypnotic analgesia to help patients through traumatic surgical procedures before the advent of inhalation anesthesia.[2] Hypnosis was used to good effect to control pain during surgery, prior to the introduction of chemical anesthesia.[2] Freud began his exploration of the unconscious through the use of hypnosis at a time when he thought of hysterical reactions as the aftermath of traumatic experiences in childhood.[3] He abandoned its use when a patient exited a trance state and embraced him. Freud, noting that "I was modest enough not to attribute this event to my own irresistible personal attractiveness." Freud[4] decided that hypnosis represented a mobilization of tranceference phenomena, and so gave it up in favor of free association and psychoanalysis, though later in his career he opined that "The pure gold of analysis might have to alloyed with the copper of suggestion."[5] Hypnotic techniques were then used during World War II to treat what were then called "traumatic neuroses." Despite the growing acceptance of psychoanalysis as the model for psychotherapy in that era, hypnotic techniques were found to be efficient and effective in helping soldiers with acute combat reactions to work through, control, or put aside the effects of traumatic experiences.[6] With the recognition of posttraumatic stress disorder (PTSD) as a diagnosis[7] has come increased interest in hypnosis as a tool in psychotherapy.

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CLINICAL APPLICATIONS OF HYPNOSIS

Hypnosis is a state of highly focused attention, coupled with dissociation of competing thoughts and sensations toward the periphery of awareness, and enhanced response to social cues.[8] Hypnosis is analogous in consciousness to what a telephoto lens does to a camera. What you see, you see with great detail, but disconnected from its visual context. In the say way, hypnosis helps you to focus attention and put aside distraction. It is comprised of three components: absorption, dissociation, and suggestibility. Hypnosis has been referred to as "self-altering attention," the capacity to lose oneself effortlessly in what one is concentrating on. Indeed, people who have more spontaneous experiences of losing themselves in a movie or a sunset are likely on formal testing to be more highly hypnotizable.[9, 10] This capacity to lose oneself implies dissociating, processing potentially distracting information outside of conscious awareness. The third component is suggestibility. This does not mean that the hypnotized person is unable to exert control over what they think and do, but rather that they are inclined to go along with hypnotic suggestions because they are less likely to consider alternatives and analyze the context of the suggestions: who is this person and why is he/she asking me to do this? We have all had the "it seemed like a good idea at the time" experience. In hypnosis, people focus more on "what" than "why," so compliance is more likely. This can actually be useful in getting patients to step away from old maladaptive ways of dealing with problems such as anxiety.

HYPNOTIZABILITY AS A TRAIT

The capacity to exert this top-down processing control involving hypnosis varies considerably among adults. While most children are highly hypnotizable, substantial variation in responsiveness to hypnosis develops in adult life and persists. Hypnotizability becomes a stable trait, with a test–retest correlation of .7 over a 25-year interval, which is greater stability than is found with intelligence over a similar interval.[11] Despite this reliability, few meaningful correlates of this trait, either psychological or neurobiological, have been identified, despite many efforts to find them.[10, 12–14] It has been established that a tendency for self-altering attention, called "absorption," is moderately but significantly correlated with hypnotizability.[9, 10] This means that people who have hypnotic capacity tend to use it spontaneously, even without any formal training or exposure to hypnotic techniques.

One especially useful way of introducing hypnosis into the therapy is through the use of a clinical hypnotizability scale, such as the Hypnotic Induction Profile.[8] This is a good way to initiate experience with hypnosis in treatment for several reasons:

(1) It provides useful information about the patient's degree of hypnotizability, which provides empirical guidance for the choice of treatment. The presence and degree of a patient's hypnotizability can help in designing treatment with hypnosis. The absence of hypnotic responsiveness, if identified, can lead to a choice of other more effective treatments, ranging from progressive muscle relaxation to medication.

(2) It enables the clinician to turn the hypnotic induction into a deduction about the patient's ability to respond. Thus reduces performance pressure on both the patient and the clinician. Such an atmosphere can enhance the treatment alliance and defuse anxieties about loss of control. It also helps to demystify hypnosis.

(3) All hypnosis is really self-hypnosis. Testing provides a framework for teaching patients how to use their capacity for self-hypnosis as part of their ongoing treatment and symptom management.

HYPNOTIC MODULATION OF PERCEPTION

Hypnosis is a powerful means of altering pain, anxiety, and various somatic functions, even under highly stressful circumstances such as interventional radiology procedures and surgery for breast cancer.[15–19] Hypnotic alteration of perception, best studied in the somatosensory and visual systems, involves a top-down resetting of the intensity of perceptual response itself, rather than just an alteration in postperception processing. This has been through reduction in early (p100) as well as late (p300) components of somatosensory event-related potentials during hypnotic analgesia instructions.[20] In addition, the nature of the hypnotic instruction influences the part of the brain involved in producing hypnotic analgesia. If subjects are told that the pain is there but will not bother them, there is reduced activity of dorsal anterior cingulate cortex (dACC), while if they are told they can reduce perception of the pain itself through a competing sensation such as tingling numbness, the analgesia is accomplished through reduced activity in somatosensory cortex.[21–23] Several studies have examined the idea that endogenous opiates account for hypnotic analgesia. However, with one partial exception,[24] studies with both volunteers[25] and patients with chronic pain[26] have shown that hypnotic analgesia is not blocked and reversed by a substantial dose of naloxone, an opiate receptor blocker. In contrast, placebo analgesia is mediated by endogenous opiates.[27] Therefore, the cortical mechanisms of hypnotic analgesia described above are a more plausible explanation for hypnotic reduction of pain.

With the use of hypnosis, believing is seeing: hypnotic alteration of color vision results in congruent changes in blood flow in the lingual and fusiform gyri.[28] An instruction to drain color from a grid like a Mondrian painting results in decreased blood flow in the color-processing regions, whereas hypnotic illusion that

a black and white grid is filled with color results in perception of the color and increased blood flow in those regions. Hypnotic suggestion that words are written in an unknown language can reduce or eliminate the well-known Stroop color–word interference phenomenon, with concomitant reduction in activation of the dACC.[13,14,29] The amount of time delay in naming a color–word presented in a different color is mediated by interaction between the dorsolateral prefrontal cortex (DLPFC) and ACC.[30] These are examples of how hypnosis can provide a model system for brain control over perception and behavior. Such hypnotic reduction of interference tasks has been shown in some studies to occur especially when the hypnotic state is induced, so the phenomenon is more than a trait difference—it requires entry into the hypnotic state among people capable of it.[31]

BRAIN REGIONS INVOLVED IN HYPNOSIS

The dACC and DLPFC contribute in important ways to both hypnotizability and sensory control. These regions are involved in the executive network of attention including selective attention and conflict resolution.[32] The dACC and lateral PFC are also part of the mesocortical dopamine system[13] and hypnotizability has been found to be correlated with levels of homovanillic acid, a dopamine metabolite, in the cerebrospinal fluid.[55] High-hypnotizable individuals, in contrast to low hypnotizables, have altered activation of the dACC[14,21–23,33–38] and PFC[13,21,34,35] when they are modulating pain perception, reducing Stroop interference, and during rest when they are in versus out of hypnotic states.[39] These findings suggest that these two brain regions are involved in top-down modulation of perception during hypnosis. We have recent evidence that there are detectable differences in functional connectivity between these regions between high- and low-hypnotizable individuals.[40] In a resting-state functional magnetic resonance imaging (fMRI) study, high- compared to low-hypnotizable individuals showed greater functional connectivity between left DLPFC, an executive-control region of the brain, and the salience network, which composed of the dACC, anterior insula, amygdala, and ventral striatum. This region is involved in detecting, integrating, and filtering relevant somatic, autonomic, and emotional information. These functional differences were not due to differences in brain anatomy in these regions. These results are similar to but not identical to observations that there are increases in left frontal activation during mindfulness practice,[41,42] Our findings differ in emphasizing co-activation of dACC along with DLPFC. Mindfulness is considered a practice that must be developed with considerable time and effort. Unlike hypnosis, it is not targeted at specific symptoms, but rather is a practice involving developing a sense of open presence, scanning of the body, and compassion. Both, however, involve developing the ability to shift among mental states, which seems to provide benefit in dealing with stress and anxiety.

ANXIETY: MIND AND BODY

Anxiety disorders are the most common of psychiatric problems, with a 12-month prevalence of 18.1% and a lifetime prevalence of 28.8%.[43] They are also archetypal mind–body problems, since an interaction between psychological and somatic distress is a hallmark feature of all of the disorders: generalized anxiety disorder, panic disorder, agoraphobia, specific phobias, acute stress disorder (ASD), and PTSD. All of these disorders involve a reciprocating cycle of mental and physical distress. This makes techniques such as hypnosis that involve enhanced control by the mind over the body especially salient to treatment.

Most people with anxiety disorders understand that, at some level, their fears are exaggerated or irrational. Yet, oddly enough this is rarely reassuring. The very lack of definition of the source of the discomfort can exaggerate the fear, enhancing the patient's sense of helplessness and desire for avoidance. And yet the more they avoid the source of the fear, the more they cement an associational network that reinforces the strength of the threat. The challenge is to convert anxiety into fear, to give it a focus, so something can be done about it, in the same sense that converting depression into sadness can help depressed individuals work through the sources of their sadness so that the erosion of their self-worth and feelings of hopelessness and helplessness are reduced. Yet to do this, one has to offer patients tools that enable them to face their fears or sadness without a downward cycle of mental and physical distress. The ability to provide physical comfort in the fact of fear is a potentially valuable therapeutic took.

From the point of view of therapeutic strategy, anxiety involves pathological distraction of attention from necessary day-to-day functions, and a negative feedback cycle between psychological preoccupation and somatic discomfort, a kind of "snowball effect," in which subjective anxiety and somatic tension reinforce one another. When someone notices an increase in heart rate, sweating, or tension in their abdomen, they are likely to respond with increased anxiety, reading the somatic signals as an indication of what a tight spot they are in. This can in turn trigger further somatic response, and on it goes. Hypnosis can be especially helpful not only because of its ability to reduce anxiety and induce relaxation,[44] but because of the dissociative element of hypnosis which facilitates separation of the psychological and somatic components of anxiety. There is evidence that hypnosis is as effective at reducing anxiety as 1 mg of alprazolam, at least among college student populations.[45] Hypnosis has also been found to have as consistent antianxiety effects in such populations as does autogenic training and quiet rest.[46] It is particularly important to employ the dissociative capacity of the patient, to help

them separate their focal attention, even that devoted to anxiety-related issues, from somatic sensations of discomfort and restlessness.

STRESS AND TRAUMA

PTSD is, unfortunately, a common disorder, with a 12-month prevalence in the United States of 3.5%, a third of these severe cases.[47] There is much that is naturally dissociative in both the immediate and the long-term response to trauma.[48–51] There are a substantial number of dissociative features in the symptoms of PTSD, especially flashbacks, numbing, and amnesia. The role of dissociation was most recently recognized in the proposal to include a dissociative subtype of PTSD in the DSM-5.[52] This change is based on new evidence that a sizeable subgroup of those with PTSD suffer additional dissociative features, notably depersonalization and derealization.[53] A recent major epidemiological study involving 25,018 people from 16 countries in a World Mental Health Survey found that 14.4% of those with PTSD also had the dissociative symptoms of depersonalization and derealization. They were characterized as well by higher levels of re-experiencing symptoms, the onset of PTSD in childhood, higher trauma exposure and childhood adversities, severe role impairment, and suicidality.[54] This subgroup can be distinguished as well using fMRI by a pattern of frontal activation and limbic suppression in response to trauma scripts, in contrast to the more comment hyperarousal type of PTSD, with hypofrontality and limbic activation.[55]

Hypnosis can be understood as a state of artificially induced dissociation,[8] and so it is especially relevant and useful in accessing memories of trauma and in helping patients to work them through as part of the treatment of PTSD. Memory is known to be state dependent,[56] so being in a comparable mental state during treatment to that experienced during trauma would understandably lead to better recall, and then to more effective working through of trauma-related memories. Exposure-based psychotherapies, which involve a combination of arousal management techniques and controlled revisiting of aspects of the trauma, are among the most effective treatments for PTSD.[57]

The fundamental principles of the use of hypnosis in the treatment of PTSD involve (1) inducing controlled access to traumatic memories; (2) helping patients to control the intense affect and strong physiological responses that may accompany memories of trauma, and (3) helping individuals restructure the memories and their meaning. Hypnotic concentration can be utilized to help patients work through and grieve various aspects of the traumatic experience and place their memories into a new perspective, which is a form of cognitive restructuring.

There are two basic means of accessing traumatic memories using hypnosis. One involves hypnotic age regression. Subjects are instructed to go back and relive earlier periods of their life as though they were occur-

ring in the present. They are told that when given a signal, they will experience the event as though it were occurring in the present. Later, when given another signal, their temporal orientation will be changed again. This technique is intense, and only useful among those who are highly hypnotizable—the upper 10–15% of hypnotizability.

An alternative and more commonly utilized method is to have them picture on an imaginary screen a pleasant scene to establish their ability to visualize in this manner and then to picture a scene taken from the traumatic experience as though they were watching it, while maintaining a comfortable feeling of floating relaxation in their body. This instructed dissociation of the psychological from the physical keeps the patient feeling comfortable and safe, and indicates his or her ability to control their somatic responses even while reliving trauma-related memories. It is useful to have them split the imagined screen in half and view the traumatic event on one side of this screen, and on the other side picture the trauma from a different point of view (e.g., focusing on what they did to protect themselves during the trauma). It might have been fighting off an assailant, attempting to help a wounded friend, or simply deciding to remain quiet so as not to provoke an attacker. It is then useful to debrief patients afterward, discussing their memories of the hypnotic work and what new meaning they have extracted from it. This is also an emotional consolidation phase in the therapy, when patients need time to work through and put into perspective strong emotions that might have been aroused by the hypnotic revisiting of the traumatic memories. Patients who are not overwhelmed by the material, who have good general mental health (i.e., are not suicidally depressed or psychotic), or who have supportive resources available can be taught to continue the therapeutic work as a self-hypnosis exercise at home. The instructions can include a repetition of the self-hypnosis induction, then using the screen technique to visualize contrasting aspects of the trauma: acknowledging and bearing their helplessness while recognizing their efforts to cope with and master the traumatic situation. This can be practiced once or twice a day. Such exercises often have the effect of organizing and containing the traumatic memories, confining them to the self-hypnosis exercises, and thereby freeing the patient to deal with other issues the remainder of the time.

STRESS MANAGEMENT

A variation of this split-screen technique involving hypnosis can be employed for stress management.[8] The subject is taught to use self-hypnosis, imagine him or herself in a physically comfortable situation—floating in a bath, a lake, a hot tub, or floating in space—and then picture the stressor on the left side of the screen while maintaining physical comfort. They are then asked to brainstorm a potential solution to the problem on the right side of the screen. This "brainstorming" is

meant to help them take a more active stance toward the problem, and to widen the score of their potential responses to it.

TREATMENT OUTCOME

One randomized outcome trial indicates that hypnosis is a useful adjunct to treatment for PTSD,[58] and there is accumulating evidence suggesting that hypnosis is highly effective.[59] There are also studies showing that hypnotizability is higher among individuals with ASD[60] as well as PTSD[61–63] Thus, the research suggests that patients with PTSD, as a group, are extremely hypnotizable. This is consistent with the theory that dissociation is a spontaneous response to trauma and is in turn a component of PTSD symptomatology. Furthermore, it provides systematic data suggesting that, as a group, individuals with PTSD should have extremely high hypnotic capacity and therefore be especially able to effectively incorporate hypnosis into their psychotherapy.[64]

PHOBIAS

Phobias are common problems that often interfere with social and occupational functioning to a pronounced degree. The 12-month prevalence of specific phobia is 8.7%, and the lifetime prevalence is 12.5%.[65] Of those with the disorder, 32.4% are receiving treatment for it. There is something hypnotic like about certain specific phobias: subjects become immobilized by a specific irrational premise and lose their usual sense of agency in controlling their fears or their responses to the feared situation. Hypnosis can be used to prepare for and during exposure to the feared situation. For example, people with flying phobia can be taught to concentrate on three concepts: (1) float with the plane; (2) think of the plane as an extension of your body, like a bicycle; (3) think about the difference between a probability and a possibility. This is designed to enhance the patient's sense of control over the situation, seeing their role in choosing the flight, while maintaining a physical sense of comfort, and putting their fears of a crash into perspective. In a large case series ($N = 174$), we found that 52% of phobics taught this self-hypnosis exercise in a single session were either improved or cured.[66] Similar approaches can be used for people with animal phobias and other simple phobias. The special advantage of self-hypnosis is that patients can be taught a skill they can practice and utilize in preparation for and during the feared situation. However, compared to its apparent effectiveness, there are relatively few randomized controlled trials of hypnosis in the treatment of anxiety disorders. Perhaps its early history of mysticism coupled with official disfavor has discouraged research. Also, techniques that clearly apply similar principles and mobilize mental state changes, such as the relaxation response[67] and Eye Movement Desensitization and Reprocessing (EMDR),[68] studiously avoid the obvious comparison.

MEDICAL, SURGICAL, AND DENTAL PROCEDURES

Because hypnosis can be used to induce a state of physical relaxation and reduce anxiety, it has proved to be valuable as an adjunct to medical procedures. Once patients have been trained in the use of self-hypnosis, they can use it both in preparation for undergoing medical procedures and during them. They can use self-hypnosis to imagine themselves being somewhere else, a place that they associate with physical comfort, such as floating in a bath, a lake, a hot tub, or just floating in space, thereby dissociating their mental experience from the physical discomfort and contextual anxiety related to the procedure. It can also be used as a means of mastering the anxiety associated with potentially threatening diagnostic procedures,[69] such as endoscopies,[70,71] colonoscopies,[72,73] imaging techniques (i.e., computed tomography and magnetic resonance imaging),[74–78] bone marrow aspirations,[79–81] needle phobia,[82–87] liver biopsy,[88] dental procedures,[89] and lumbar punctures.[81,86,90] Hypnosis is also helpful in helping patients through therapeutic interventions such as chemotherapy[75,91–103] Faymonville et al. 1995, external beam radiation therapy,[104,105] surgery and its recovery,[106,107] and interventional radiology.[108–110] A randomized clinical trial involving patients undergoing percutaneous vascular and renal procedures compared training in hypnosis with the presence of a sympathetic nurse for emotional support and routine analgesia. All subjects had access to patient-controlled intravenous analgesia. The subjects in the hypnosis condition used half the pain medication, and experienced significantly less pain and anxiety, fewer procedural complications, and overall procedure time was 17 min shorter. The cost of the procedure was $348 less per patient in the hypnosis condition. So, hypnosis made their experience less uncomfortable, less anxiety provoking, safer, and shorter.

HYPNOTIC EFFECTS ON THE BODY

There is evidence that hypnosis can facilitate a surprising amount of control over somatic functions that are not thought likely susceptible to mental management. For example, we examined the ability of hypnosis to both stimulate and inhibit gastric acid secretion among highly hypnotizable healthy volunteers. When subjects were hypnotized and instructed to imagine eating a series of delicious meals, gastric acid output rose from a basal mean of 3.60 ± 0.48 to a mean of 6.80 ± 0.02 mmol with hypnosis, an increase of 89% ($P = .0007$). In a related study, subjects underwent two sessions of gastric analysis in random order, once with no hypnosis and once with a hypnotic instruction to experience deep relaxation while not thinking about food or drink. With hypnosis, there was a 39% reduction in basal acid output (4.29 ± 0.93 vs. 2.60 ± 0.44 mmol,

$P < .05$) and an 11% reduction in peak gastric acid output stimulated by pentagastrin (28.69 ± 2.34 vs. 25.43 ± 2.98 mmol, $P < .05$). Thus, there was bidirectional control of gastric acid output related to the type of hypnotic instruction. Hypnosis has also been used in the rehabilitation of such problems as pseudoepilepsy,[111–113] irritable bowel syndrome,[18,114–117] and contractures of the hand.[118]

PSYCHOTHERAPY FOR WOMEN WITH BREAST CANCER

The effect of psychosocial support on cancer progression is a far more complex problem. Since claims have been made that simply visualizing white blood cells killing cancer cells could affect survival time,[119] we undertook a series of studies of the effects of intensive psychosocial treatment involving hypnosis and group psychotherapy on both quality of life and survival time of women with metastatic breast cancer.

We developed a 1-year weekly group psychotherapy intervention: Supportive–Expressive Group Psychotherapy (SEGT). The groups are designed to provide social support and encourage emotional expression, and last 1.5 hours. They work on problem clarification, grief work related to having cancer and the effects of the illness, guidance regarding family problems, doctor-patient relationships, and reordering life priorities in the face of terminal illness. Group members are taught self-hypnosis to process major themes discussed in the groups, and for the management of cancer-related anxiety and pain. The groups emphasize building intense mutual support. Group members are encouraged to discuss the ways in which they have acquired expertise in coping with the illness, thereby enabling them able to provide concrete assistance to other patients.[120–124] The group provides a new network of support while enhancing existing family and other social ties. Our experience is that even direct confrontation with progressive disease or death among members is not demoralizing to patients when handled appropriately[125,126] and that such involvement reduces mood disturbance, PTSD symptoms,[120] and pain[127,128] among metastatic cancer patients. The groups emphasize accommodation to the illness, accepting restrictions in life activities and plans as necessary, and working through fears of dying and death.[124,125] The confrontation with mortality brought on by cancer is treated as an opportunity to review and revise life values and enhance control over one's intrapsychic and interper-sonal experience. Patients are taught to use the group to examine important personal relationships and set realistic goals for change. In this way, the threat of limited survival is reconceptualized as a challenge to make the best possible use of available time with family and friends. However, patients are not instructed to expect any direct effect of the intervention on the course of the disease. The intervention protocol has been manualized,[129,130] and therapists have been successfully trained and evaluated for their abilities to (1) personalize interactions so that they focus on the "here-and-now"; (2) encourage emotional expression; (3) encourage active coping; and (4) maintain group boundaries.[131]

Emotional expression in a supportive, empathic environment is a key component in the reduction of psychological distress in ill patients.[132–134] The concept of *social–cognitive processing* synthesizes social support and emotional expressiveness.[135] The supportive/expressive model of group support encourages therapists to facilitate open ventilation of fears of dying and death, anxiety about the future, and sadness regarding life losses.[129] Even grieving the deaths of other members can be reassuring by helping those who are dying experience the depth of feeling others will have for them when they die. Some also feel fortunate, reappraising their situation as more fortunate than that of someone else in the group who has died of the same illness.[136–138] Indeed, emotional suppression and avoidance inhibit active coping and are associated with reduced intimacy among family members. We have shown in a number of randomized clinical trials that such expression of emotion reduces rather than increases distress,[120,139,140] even among those with significant depression.[141] Our studies have demonstrated that the mechanism of improvement in distress through SEGT is reduced suppression of emotion,[133] which mediates the reduction in distress. We conceptualize these psychological changes as involving two interrelated processes: (1) a reduction in emotional reactivity, and (2) improved ability to regulate distressing negative emotion. Moreover, effects of SEGT on emotion regulation appear to be both general across the domain of negative emotion (e.g., related to anxiety and depression symptoms) as well as specifically within the domain of cancer-related negative emotion.

EFFECTS ON SURVIVAL

Could psychotherapeutic support for cancer patients actually affect the course of cancer? We reported in 1989 (Fig. 1) the results of a clinical trial demonstrating that women with metastatic breast cancer randomized to a year of weekly group therapy lived 18 months longer than control patients, and that the difference was not due to differences in initial disease severity or subsequent chemo- and radiotherapy.[142] The result of this 10-year study was first greeted with great excitement and later skepticism. We understand both reactions.

The hope that intensive emotional support could add to both quality and quantity of life would provide additional opportunities for effective treatment of breast cancer in conjunction with advances in surgical, chemotherapeutic, hormonal, monoclonal antibody, and radiotherapeutic interventions. At the same time, the idea that improved coping, facing existential concerns, better emotion management, and enhanced social support could actually affect disease progression would seem on its face unlikely, and could add a burden of guilt to patients already suffering from the cancer and its treatment.
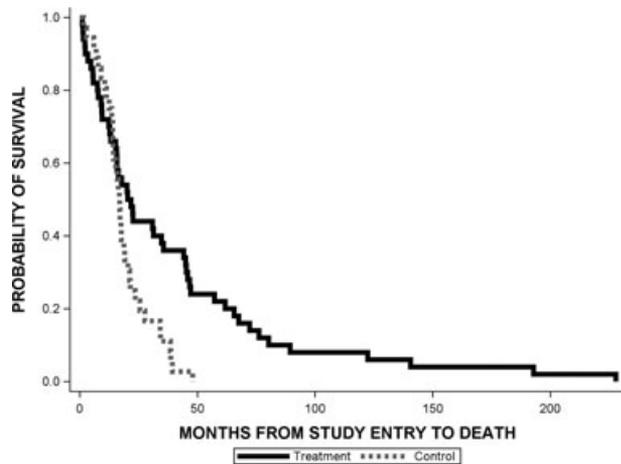
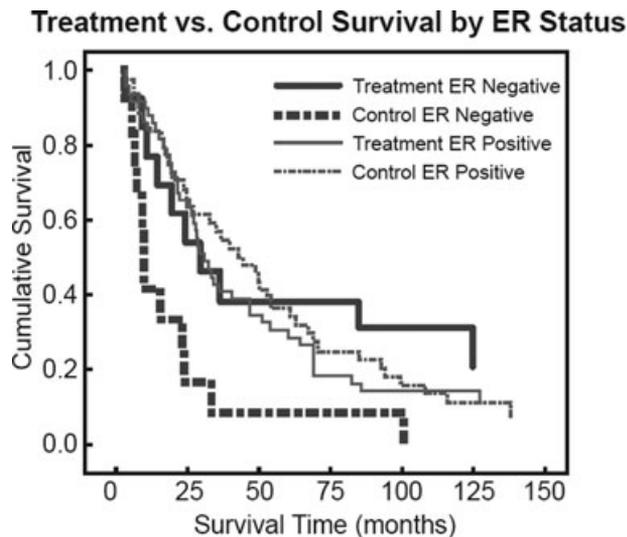Figure 1. Psychosocial intervention and cancer survival.

Figure 2. Ineraction of ER status with group therapy treatment effect on survival.

In the spirit of further examining the relationship between group psychotherapy and breast cancer survival, we replicated the study a decade later that showed no overall effect of a similar group therapy intervention on breast cancer survival, but a significant interaction with tumor type, such that those with ER negative cancers who were randomized to group therapy lived significantly longer than did ER negative patients receiving standard care alone (Fig. 2).[143] This second study failed to confirm the main hypothesis that facing death together could improve survival, and we questioned the original finding. Major advances in hormonal and chemotherapies improved overall survival for women with metastatic breast cancer in the interim,[144] but women with ER negative tumors do not benefit from the advancement in treatment outcome associated with antiestrogen treatments.[144, 145] So, it was possible that the earlier improvement in outcome had been

supplanted by better overall survival, with the exception of ER negative women. This explanation receives some support from other recent studies by independent investigators.[146] Overall survival of our cohorts of women with metastatic breast cancer has improved over the decades.

An independent randomized trial of psychoeducational groups for women with primary breast cancer found significantly reduced rates of relapse and longer survival.[147, 148] In addition to this and our original study,[142] a recent randomized clinical trial of palliative care for nonsmall cell lung cancer patients published in the *New England Journal of Medicine* makes that case strongly.[149] There was a clear but apparently paradoxical finding: "Despite receiving less aggressive end-of-life care, patients in the palliative care group had significantly longer survival than those in the standard care group (median survival, 11.65 vs. 8.9 months; $p = .02$)"[149] (p. 738). Those in the palliative care condition became less depressed as well. Three other published randomized trials[150–154] and one matched cohort trial[155] have found that psychosocial treatment for patients with a variety of cancers produced both psychological and survival benefits. However, seven other published studies, six involving breast cancer patients,[156–161] and one with lung and gastrointestinal cancer patients,[162] found no survival benefit for those treated with psychotherapy. Three of these six studies showed no emotional benefit of the intervention,[156, 158, 163] making any possible survival advantage unlikely. In a major multicenter trial that reported significant reduction of depression but no effect on survival, the treatment group was more depressed than the control group at baseline,[159] which gave them a poorer medical prognosis based on recent research.[164, 165] Furthermore, the outcome of all of these studies is not random: no studies show that such attention to depression and mortality shortens survival.[146] Thus, the literature makes it a plausible research question to examine whether psychosocial support can extend cancer survival time, especially since pathways linking stress reduction to changes in endocrine, immune and autonomic nervous system function, and gene expression to cancer progression are being identified.

CONCLUSION

Hypnosis is a naturally occurring state of highly focused attention. People vary in their ability to utilize it. It has special relevance to the assessment and treatment of anxiety disorders, including PTSD, because of its sensitizing role in enhancing the potential for mind–body control. The phenomena that constitute hypnosis: absorption, dissociation, and suggestibility, are mobilized spontaneously during trauma, during which they may serve as a unique and adaptive defense against overwhelming fear, pain, and anxiety. Thus, hypnotic phenomena underlie important aspects of the response to

stress and trauma. More is being learned about brain function related to hypnosis. Hypnotic alteration of perception is accompanied by marked changes in the relevant sensory cortices, as well as brain regions involving context monitoring (dorsal anterior cingulated gyrus) and executive function (DLPFC). Hypnosis alters sensation itself, not just response to sensory input, making it a powerful tool in modulating pain as well as anxiety. Self-hypnosis is a useful skill to teach people dealing with phobias and medically related anxiety. More intensive psychotherapeutic techniques involving group therapy and hypnosis improve quality of life, reduce pain, and may extend survival time with cancer. Hypnosis is the oldest Western conception of psychotherapy, but it involves some of our newest understandings of the relationship between brain function and our ability to control pain, anxiety, and the consequences of disease.

REFERENCES

1. Ellenberger HF. The Discovery of the Unconscious: The History and Evolution of Dynamic Psychiatry. New York: Basic Books, Inc.; 1970.
2. Esdaile J. Hypnosis in Medicine and Surgery. New York: Julian Press; 1846.
3. Breuer J, Freud S. Studies in hysteria. In: Strachey J, editor. The Standard Edition of the Complete Psychological Works of Sigmund Freud. London: Hogarth Press; 1893–95:183–251.
4. Freud S. An Autobiographical Study. London: Hogarth Press; 1925.
5. Freud S. Lines of advance in psycho-analytic therapy. Wege der Psychoanalytischen Therapie 1919;5:61–68.
6. Kardiner A, Spiegel H. War Stress and Neurotic Illness. New York: Hoeber; 1947.
7. APA. Diagnostic and Statistical Manual of Mental Disorders. 4th ed., text revision. Washington, DC: American Psychiatric Press; 2000.
8. Spiegel H, Spiegel D. Trance and Treatment: Clinical Uses of Hypnosis. Washington, DC: American Psychiatric Publishing; 2004.
9. Tellegen A. Practicing the two disciplines for relaxation and enlightenment: comment on "Role of the feedback signal in electromyograph biofeedback: the relevance of attention" by Qualls and Sheehan. J Exp Psychol Gen 1981;110(2):217–231.
10. Tellegen A, Atkinson G. Openness to absorbing and self-altering experiences ("absorption"), a trait related to hypnotic susceptibility. J Abnorm Psychol 1974;83(3):268–277.
11. Piccione C, Hilgard ER, Zimbardo PG. On the degree of stability of measured hypnotizability over a 25-year period. J Pers Soc Psychol 1989;56(2):289–295.
12. Lichtenberg P, Bachner-Melman R, Ebstein RP, Crawford HJ. Hypnotic susceptibility: multidimensional relationships with Cloninger's Tridimensional Personality Questionnaire, COMT polymorphisms, absorption, and attentional characteristics. Int J Clin Exp Hypn 2004;52(1):47–72.
13. Raz A. Attention and hypnosis: neural substrates and genetic associations of two converging processes. Int J Clin Exp Hypn 2005;53(3):237–258.
14. Raz A, Fan J, Posner MI. Hypnotic suggestion reduces conflict in the human brain. Proc Nat Acad Sci USA 2005;102(28):9978–9983.
15. Lang EV, Berbaum KS, Faintuch S, et al. Adjunctive self-hypnotic relaxation for outpatient medical procedures: a prospective randomized trial with women undergoing large core breast biopsy. Pain 2006;126(1–3):155–164.
16. Lang EV, Benotsch EG, Fick LJ, et al. Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomised trial. Lancet 2000;355:1486–1490.
17. Montgomery GH, Bovbjerg DH, Schnur JB, et al. A randomized clinical trial of a brief hypnosis intervention to control side effects in breast surgery patients. J Nat Cancer Inst 2007;99(17):1304–1312.
18. Whorwell PJ, Prior A, Faragher EB. Controlled trial of hypnotherapy in the treatment of severe refractory irritable-bowel syndrome. Lancet 1984;2(8414):1232–1234.
19. Colgan SM, Faragher EB, Whorwell PJ. Controlled trial of hypnotherapy in relapse prevention of duodenal ulceration. Lancet 1988;1(8598):1299–1300.
20. Spiegel D, Bierre P, Rootenberg J. Hypnotic alteration of somatosensory perception. Am J Psychiatry 1989;146(6):749–754.
21. Rainville P, Hofbauer RK, Paus T, et al. Cerebral mechanisms of hypnotic induction and suggestion. J Cogn Neurosci 1999;11(1):110–125.
22. Faymonville ME, Laureys S, Degueldre C, et al. Neural mechanisms of antinociceptive effects of hypnosis. Anesthesiology 2000;92(5):1257–1267.
23. Rainville P, Hofbauer RK, Bushnell MC, et al. Hypnosis modulates activity in brain structures involved in the regulation of consciousness. J Cogn Neurosci 2002;14(6):887–901.
24. Frid M, Singer G. Hypnotic analgesia in conditions of stress is partially reversed by naloxone. Psychopharmacology 1979;63(3):211–215.
25. Goldstein A, Hilgard ER. Failure of the opiate antagonist naloxone to modify hypnotic analgesia. Proc Nat Acad Sci USA 1975;72(6):2041–2043.
26. Spiegel D, Albert L. Naloxone fails to reverse hypnotic alleviation of chronic pain. Psychopharmacology 1983;81:140–143.
27. Zubieta JK, Bueller JA, Jackson LR, et al. Placebo effects mediated by endogenous opioid activity on mu-opioid receptors. J Neurosci 2005;25(34):7754–7762.
28. Kosslyn SM, Thompson WL, Costantini-Ferrando MF, et al. Hypnotic visual illusion alters color processing in the brain. Am J Psychiatry 2000;157(8):1279–1284.
29. Raz A, Shapiro T, Fan J, Posner MI. Hypnotic suggestion and the modulation of Stroop interference. Arch Gen Psychiatry 2002;59(12):1155–1161.
30. Morishima Y, Okuda J, Sakai K. Reactive mechanism of cognitive control system. Cereb Cortex 2010;20(11):2675–2683.
31. Iani C, Ricci F, Baroni G, Rubichi S. Attention control and susceptibility to hypnosis. Conscious Cogn 2009;18(4):856–863.
32. Pochon JB, Riis J, Sanfey AG, et al. Functional imaging of decision conflict. J Neurosci 2008;28(13):3468–3473.
33. Szechtman H, Woody E, Bowers KS, Nahmias C. Where the imaginal appears real: a positron emission tomography study of auditory hallucinations. Proc Nat Acad Sci USA 1998;95(4):1956–1960.
34. Maquet P, Faymonville ME, Degueldre C, et al. Functional neuroanatomy of hypnotic state. Biol Psychiatry 1999;45(3):327–333.
35. Derbyshire SW, Whalley MG, Stenger VA, Oakley DA. Cerebral activation during hypnotically induced and imagined pain. Neuroimage 2004;23(1):392–401.
36. Schulz-Stubner S, Krings T, Meister IG, et al. Clinical hypnosis modulates functional magnetic resonance imaging signal intensities and pain perception in a thermal stimulation paradigm. Reg Anesth Pain Med 2004;29(6):549–556.

37. Egner T, Jamieson G, Gruzelier J. Hypnosis decouples cognitive control from conflict monitoring processes of the frontal lobe. Neuroimage 2005;27(4):969–978.

38. Raij TT, Numminen J, Narvanen S, et al. Brain correlates of subjective reality of physically and psychologically induced pain. Proc Nat Acad Sci USA 2005;102(6):2147–2151.

39. McGeown WJ, Mazzoni G, Venneri A, Kirsch I. Hypnotic induction decreases anterior default mode activity. Conscious Cogn 2009;18(4):848–855.

40. Hoeft F, Gabrieli JDE, Whitfield-Gabrieli S, et al. Functional brain basis of hypnotizability. Arch Gen Psychiatry 2012;89(10):1054–1072.

41. Davidson RJ. Empirical explorations of mindfulness: conceptual and methodological conundrums. Emotion 2010;10(1):8–11.

42. Davidson RJ, Kabat-Zinn J, Schumacher J, et al. Alterations in brain and immune function produced by mindfulness meditation. Psychosom Med 2003;65(4):564–570.

43. NIMH. Prevalence of Anxiety Disorders. Available at: http://www.nimh.nih.gov/statistics/1SPEC_ADULT.shtml 2012.

44. Spiegel D. The mind prepared: hypnosis in surgery. J Nat Cancer Inst 2007;99(17):1280–1281.

45. Nishith P, Barabasz A, Barabasz M, Warner D. Brief hypnosis substitutes for alprazolam use in college students: transient experiences and quantitative EEG responses. Am J Clin Hypn 1999;41(3):262–268.

46. Garvin AW, Trine MR, Morgan WP. Affective and metabolic responses to hypnosis, autogenic relaxation, and quiet rest in the supine and seated positions. Int J Clin Exp Hypn 2001;49(1):5–18.

47. NIMH. Prevalence of PTSD. Available at: http://www.nimh.nih.gov/statistics/1AD_PTSD_ADULT.shtml 2012.

48. Spiegel D, Cardena E. Disintegrated experience: the dissociative disorders revisited. J Abnorm Psychol 1991;100(3):366–378.

49. Butler LD, Duran EFD, Jasiukatis P, et al. Hypnotizability and traumatic experience: a diathesis-stress model of dissociative symptomatology. Am J Psychiatry 1996;153(7):42–63.

50. Marmar CR, Weiss DS, Schlenger WE, et al. Peritraumatic dissociation and posttraumatic stress in male Vietnam theater veterans. Am J Psychiatry 1994;151(6):902–907.

51. Stein DJ, Koenen KC, Friedman MJ, et al. Dissociation in posttraumatic stress disorder: evidence from the World Mental Health Surveys. Biol Psychiatry 2012.

52. Lanius RA, Brand B, Vermetten E, Frewen PA, Spiegel, D. The dissociative subtype of posttraumatic stress disorder: rationale, clincial and neurobiological evidence, and implications. Depression and Anxiety 2012;29(8):701–708.

53. Lanius RA, Brand B, Vermetten E, et al. The dissociative subtype of posttraumatic stress disorder: rationale, clinical and neurobiological evidence, and implications. Depress Anxiety 2012;8:701–708.

54. Stein S, Spiegel D. Symptoms of PTSD among 1000 school children exposed to media accounts of the Polly Klaas kidnapping. In press.

55. Lanius RA, Vermetten E, Loewenstein RJ, et al. Emotion modulation in PTSD: clinical and neurobiological evidence for a dissociative subtype. Am J Psychiatry 2010;167(6):640–647.

56. Bower GH. Mood and memory. Am Psychol 1981;36(2):129–148.

57. Medicine Io. Treatment of PTSD: An Assessment of the Evidence. Washington, D.C.: National Academies Press; 2007.

58. Brom D, Kleber RJ, Defare PB. Brief psychotherapy for posttraumatic stress disorder. J Consult Clin Psychol 1989;57:607–612.

59. Solomon SD, Gerrity ET, Muff AM. Efficacy of treatments for posttraumatic stress disorder. An empirical review. J Am Med Assoc 1992;268(5):633–638.

60. Bryant RA, Guthrie RM, Moulds ML. Hypnotizability in acute stress disorder. Am J Psychiatry 2001;158(4):600–604.

61. Stutman RK, Bliss EL. Posttraumatic stress disorder, hypnotizability, and imagery. Am J Psychiatry 1985;142(6):741–743.

62. Spiegel D, Hunt T, Dondershine HE. Dissociation and hypnotizability in posttraumatic stress disorder. Am J Psychiatry 1988;145(3):301–305.

63. Bryant RA, Guthrie RM, Moulds ML, et al. Hypnotizability and posttraumatic stress disorder: a prospective study. Int J Clin Exp Hypn 2003;51(4):382–389.

64. Cardena E. Hypnosis in the treatment of trauma: a promising, but not fully supported, efficacious intervention. Int J Clin Exp Hypn 2000;48(2):225–238.

65. NIMH. Phobia Prevalence. Available at: http://www.nimh.nih.gov/statistics/1SPEC_ADULT.shtml 2012.

66. Spiegel H, Spiegel D, Frischholz EJ, Maruffi BL. Hypnotic responsivity and the treatment of flying phobia. Am J Clin Hypn 1981;23(4):239–247.

67. Benson H. The Relaxation Response. New York: William Morrow and Co; 1975.

68. McNally RJ. EMDR and mesmerism: a comparative historical analysis. J Anxiety Disord 1999;13(1–2):225–236.

69. Rape RN, Bush JP. Psychological preparation for pediatric oncology patients undergoing painful procedures: a methodological critique of the research. Child Health Care 1994;23(1):51–67.

70. Cavallo G, Cuomo R, Viscardi A, et al. Hypnosis for upper gastrointestinal endoscopy. Gastrointest Endosc 1985;31(3):228.

71. Sutherland RJ, Knox J. Hypnosis for endoscopy. Lancet 1976;2(7997):1244.

72. Cadranel JF, Benhamou Y, Zylberberg P, et al. Hypnotic relaxation: a new sedative tool for colonoscopy? J Clin Gastroenterol 1994;18(2):127–129.

73. Elkins G, White J, Patel P, et al. Hypnosis to manage anxiety and pain associated with colonoscopy for colorectal cancer screening: case studies and possible benefits. Int J Clin Exp Hypn 2006;54(4):416–431.

74. Chandler T. Techniques for optimizing MRI relaxation and visualization. Adm Radiol J 1996;15(3):16–18.

75. Covino NA, Frankel FH. Hypnosis and relaxation in the medically ill. Psychother Psychosom 1993;60(2):75–90.

76. Friday PJ, Kubal WS. Magnetic resonance imaging: improved patient tolerance utilizing medical hypnosis. Am J Clin Hypn 1990;33(2):80–84.

77. Simon EP. Improving tolerance of MR imaging with medical hypnosis. AJR Am J Roentgenol 1999;172(6):1694–1695.

78. Simon EP. Hypnosis using a communication device to increase magnetic resonance imaging tolerance with a claustrophobic patient. Mil Med 1999;164(1):71–72.

79. Ellis JA, Spanos NP. Cognitive-behavioral interventions for children's distress during bone marrow aspirations and lumbar punctures: a critical review. J Pain Symptom Manage 1994;9(2):96–108.

80. Liossi C, Hatira P. Clinical hypnosis versus cognitive behavioral training for pain management with pediatric cancer patients undergoing bone marrow aspirations. Int J Clin Exp Hypn 1999;47(2):104–116.

81. Hageman-Wenselaar LH. [Hypnosis for pain control during lumbar puncture and bone marrow aspirations in children with cancer]. Tijdschr Kindergeneeskd 1988;56(3):120–123.

82. Bell DS, Christian ST, Clements RS Jr. Acuphobia in a long-standing insulin-dependent diabetic patient cured by hypnosis. Diabetes Care 1983;6(6):622.

83. Dash J. Rapid hypno-behavioral treatment of a needle phobia in a five-year-old cardiac patient. J Pediatr Psychol 1981;6(1):37–42.

84. Morse DR, Cohen BB. Desensitization using meditation-hypnosis to control "needle" phobia in two dental patients. Anesth Prog 1983;30(3):83–85.

85. Nugent WR, Carden NA, Montgomery DJ. Utilizing the creative unconscious in the treatment of hypodermic phobias and sleep disturbance. Am J Clin Hypn 1984;26(3):201–205.

86. Simon EP, Canonico MM. Use of hypnosis in controlling lumbar puncture distress in an adult needle-phobic dementia patient. Int J Clin Exp Hypn 2001;49(1):56–67.

87. Usberti M, Grutta d'Auria C, Borghi M, et al. Usefulness of hypnosis for renal needle biopsy in children. Kidney Int 1984;26(3):351–352.

88. Adams PC, Stenn PG. Liver biopsy under hypnosis. J Clin Gastroenterol 1992;15(2):122–124.

89. Moore R, Abrahamsen R, Brodsgaard I. Hypnosis compared with group therapy and individual desensitization for dental anxiety. Eur J Oral Sci 1996;104(5–6):612–618.

90. Kellerman J, Zeltzer L, Ellenberg L, Dash J. Adolescents with cancer. Hypnosis for the reduction of the acute pain and anxiety associated with medical procedures. J Adolesc Health Care 1983;4(2):85–90.

91. Hilgard JR, LeBaron S. Relief of anxiety and pain in children and adolescents with cancer: quantitative measures and clinical observations. Int J Clin Exp Hypn 1982;30(4):417–442.

92. Zeltzer L, Kellerman J, Ellenberg L, Dash J. Hypnosis for reduction of vomiting associated with chemotherapy and disease in adolescents with cancer. J Adolesc Health Care 1983;4(2):77–84.

93. Genuis ML. The use of hypnosis in helping cancer patients control anxiety, pain, and emesis: a review of recent empirical studies. Am J Clin Hypn 1995;37(4):316–325.

94. Katz ER, Kellerman J, Ellenberg L. Hypnosis in the reduction of acute pain and distress in children with cancer. J Pediatr Psychol 1987;12(3):379–394.

95. Richardson J, Smith JE, McCall G, Pilkington K. Hypnosis for procedure-related pain and distress in pediatric cancer patients: a systematic review of effectiveness and methodology related to hypnosis interventions. J Pain Symptom Manage 2006;31(1):70–84.

96. Syrjala KL, Cummings C, Donaldson GW. Hypnosis or cognitive behavioral training for the reduction of pain and nausea during cancer treatment: a controlled clinical trial. Pain 1992;48(2):137–146.

97. Zeltzer L, LeBaron S. Hypnosis and nonhypnotic techniques for reduction of pain and anxiety during painful procedures in children and adolescents with cancer. J Pediatr 1982;101(6):1032–1035.

98. Jacknow DS, Tschann JM, Link MP, Boyce WT. Hypnosis in the prevention of chemotherapy-related nausea and vomiting in children: a prospective study. J Dev Behav Pediatr 1994;15(4):258–264.

99. Renouf D. Hypnotically induced control of nausea: a preliminary report. J Psychosom Res 1998;45(3):295–296.

100. Zeltzer L, LeBaron S, Zeltzer PM. The effectiveness of behavioral intervention for reduction of nausea and vomiting in children and adolescents receiving chemotherapy. J Clin Oncol 1984;2(6):683–690.

101. Axelrod A, Vinciguerra V, Brennan-O'Neill E, Moore T. A preliminary report on the efficacy of hypnosis to control anticipatory nausea and vomiting caused by cancer chemotherapy. Prog Clin Biol Res 1988;278:147–150.

102. Cotanch P, Hockenberry M, Herman. Self-hypnosis as antiemetic therapy in children receiving chemotherapy. Oncol Nurs Forum 1985;12(4):41–46.

103. Marchioro G, Azzarello G, Viviani F, et al. Hypnosis in the treatment of anticipatory nausea and vomiting in patients receiving cancer chemotherapy. Oncology 2000;59(2):100–104.

104. Steggles S. The use of cognitive-behavioral treatment including hypnosis for claustrophobia in cancer patients. Am J Clin Hypn 1999;41(4):319–326.

105. Bertoni F, Bonardi A, Magno L, et al. Hypnosis instead of general anaesthesia in paediatric radiotherapy: report of three cases. Radiother Oncol 1999;52(2):185–190.

106. Kessler R, Dane JR. Psychological and hypnotic preparation for anesthesia and surgery: an individual differences perspective. Int J Clin Exp Hypn 1996;44(3):189–207.

107. Lambert SA. The effects of hypnosis/guided imagery on the postoperative course of children. J Dev Behav Pediatr 1996;17(5):307–310.

108. Lang EV, Benotsch EG, Fick LJ, et al. Adjunctive non-pharmacological analgesia for invasive medical procedures: a randomised trial. Lancet 2000;355(9214):1486–1490.

109. Lang EV, Joyce JS, Spiegel D, et al. Self-hypnotic relaxation during interventional radiological procedures: effects on pain perception and intravenous drug use. Int J Clin Exp Hypn 1996;44(2):106–119.

110. Spiegel D. Wedding hypnosis to the radiology suite. Pain 2006;126(1–3):3–4.

111. Barry JJ, Atzman O, Morrell MJ. Discriminating between epileptic and nonepileptic events: the utility of hypnotic seizure induction. Epilepsia 2000;41(1):81–84.

112. Devinsky O, Putnam F, Grafman J, et al. Dissociative states and epilepsy. Neurology 1989;39(6):835–840.

113. Levine DN. Utility of suggestion-induced spells in diagnosis of pseudoseizures. Ann Neurol 1994;36(3):450.

114. Anton PA. Stress and mind-body impact on the course of inflammatory bowel diseases. Semin Gastrointest Dis 1999;10(1):14–19.

115. Galovsky TE, Blanchard EB. Hypnotherapy and refractory irritable bowel syndrome: a single case study. Am J Clin Hypn 2002;45(1):31–37.

116. Palsson OS, Turner MJ, Johnson DA, et al. Hypnosis treatment for severe irritable bowel syndrome: investigation of mechanism and effects on symptoms. Dig Dis Sci 2002;47(11):2605–2614.

117. Whorwell PJ, Prior A, Colgan SM. Hypnotherapy in severe irritable bowel syndrome: further experience. Gut 1987;28:423–425.

118. Spiegel D, Chase RA. The treatment of contractures of the hand using self-hypnosis. J Hand Surg Am 1980;5(5):428–432.

119. Simonton OC, Mathews-Simonton S, Creighton J. Getting Well Again. Los Angeles: J.P. Tracher, Inc. 1978.

120. Spiegel D, Bloom JR, Yalom I. Group support for patients with metastatic cancer. A randomized outcome study. Arch Gen Psychiatry 1981;38(5):527–533.

121. Spiegel D. Facilitating emotional coping during treatment. Cancer 1990;66(6 Suppl):1422–1426.

122. Spiegel D. Living Beyond Limits: New Help and Hope for Facing Life-Threatening Illness. New York: Times Books/Random House; 1993.

123. Spiegel D. A 43-year-old woman coping with cancer [clinical conference] [see comments]. J Am Med Assoc 1999;282(4):371–378.

124. Spiegel D, Yalom I. A support group for dying patients. Int J Group Psychother 1978;28:233–245.

125. Spiegel D, Glafkides MC. Effects of group confrontation with death and dying. Int J Group Psychother 1983;33(4):433–447.

126. Taylor SE, Lobel M. Social comparison activity under threat: downward evaluation and upward contacts. Psychol Rev 1989;96(4):569–575.

127. Spiegel D, Bloom JR. Group therapy and hypnosis reduce metastatic breast carcinoma pain. Psychosom Med 1983;45(4):333–339.

128. Butler LD, Koopman C, Neri E, et al. Effects of supportive-expressive group therapy on pain in women with metastatic breast cancer. Health Psychol 2009;28(5):579–587.

129. Spiegel D, Classen C. Group Therapy for Cancer Patients: A Research-Based Handbook of Psychosocial Care. New York: Basic Books; 2000.

130. Classen C, Diamond S, Spiegel D. Brief Supportive-Expressive Group Therapy for High Risk Breast Cancer Patients. Stanford, CA: Psychosocial Treatment Laboratory, Department of Psychiatry and Behavioral Sciences, Stanford University School of Medicine; 1994.

131. Classen C, Abramson S, Angell K, et al. Effectiveness of a training program for enhancing therapists' understanding of the supportive-expressive treatment model for breast cancer groups. J Psychother Pract Res 1997;6(3):211–218.

132. Ginzburg K, Arnow B, Hart S, et al. The abuse-related beliefs questionnaire for survivors of childhood sexual abuse. Child Abuse Negl 2006;30(8):929–943.

133. Giese-Davis J, Koopman C, Butler L, et al. Change in emotion-regulation strategy for women with metastatic breast cancer following supportive-expressive group therapy. J Consult Clin Psychol 2002;70(4):916–925.

134. Spiegel D. Mind matters – group therapy and survival in breast cancer. N Engl J Med 2001;345(24):1767–1768.

135. Lepore SJ, Ituarte PHG. Optimism about cancer enhances mood by reducing negative social relations. Cancer Res Ther Control 1999;8:165–174.

136. Taylor S, Dakof G. Social Support and the Cancer Patient. Newbury Park, CA: Sage; 1988.

137. Taylor SE, Lichtman RR, Wood JV. Attributions, beliefs about control, and adjustment to breast cancer. J Pers Soc Psychol 1984;46(3):489–502.

138. Taylor SE, Lichtman RR, Wood JV, et al. Illness-related and treatment-related factors in psychological adjustment to breast cancer. Cancer 1985;55(10):2506–2513.

139. Classen C, Butler LD, Koopman C, et al. Supportive-expressive group therapy reduces distress in metastatic breast cancer patients: a randomized clinical intervention trial. Arch Gen Psychiatry 2001;58:494–501.

140. Spiegel D, Yalom ID. A support group for dying patients. Int J Group Psychother 1978;28(2):233–245.

141. Akechi T, Okuyama T, Onishi J, et al. Psychotherapy for depression among incurable cancer patients. Cochrane Database Syst Rev 2008;2:CD005537.

142. Spiegel D, Bloom JR, Kraemer HC, Gottheil E. Effect of psychosocial treatment on survival of patients with metastatic breast cancer. Lancet 1989;2(8668):888–891.

143. Spiegel D, Butler LD, Giese-Davis J, et al. Effects of supportive-expressive group therapy on survival of patients with metastatic breast cancer: a randomized prospective trial. Cancer 2007;110(5):1130–1138.

144. Peto R, Boreham J, Clarke M, et al. UK and USA breast cancer deaths down 25% in year 2000 at ages 20–69 years. Lancet 2000;355(9217):1822.

145. Davies C, Godwin J, Gray R, et al. Relevance of breast cancer hormone receptors and other factors to the efficacy of adjuvant tamoxifen: patient-level meta-analysis of randomised trials. Lancet 2011;378(9793):771–784.

146. Spiegel D. Mind matters in cancer survival. J Am Med Assoc 2011;305(5):502–503.

147. Andersen BL, Yang HC, Farrar WB, et al. Psychologic intervention improves survival for breast cancer pa-

tients: a randomized clinical trial. Cancer 2008;113(12):3450–3458.

148. Andersen BL, Thornton LM, Shapiro CL, et al. Biobehavioral, immune, and health benefits following recurrence for psychological intervention participants. Clin Cancer Res 16(12):3270–3278.

149. Temel JS, Greer JA, Muzikansky A, et al. Early palliative care for patients with metastatic non-small-cell lung cancer. N Engl J Med 2010;363(8):733–742.

150. Andersen BL, Shapiro CL, Farrar WB, et al. Psychological responses to cancer recurrence. Cancer 2005;104(7):1540–1547.

151. Fawzy F, Fawzy N, Hyun C, et al. Malignant melanoma: effects of an early structural psychiatric intervention, coping and affective state on recurrence and survival 6 years later. Arch Gen Psychiatry 1993;50:681–689.

152. Chen HC, Chen WC, Lin KH, et al. Simultaneous use of traditional Chinese medicine (si-ni-tang) to treat septic shock patients: study protocol for a randomized controlled trial. Trials 2011;12:199.

153. Kuchler T, Bestmann B, Rappat S, et al. Impact of psychotherapeutic support for patients with gastrointestinal cancer undergoing surgery: 10-year survival results of a randomized trial. J Clin Oncol 2007;25(19):2702–2708.

154. Kuchler T, Henne-Bruns D, Rappat S, et al. Impact of psychotherapeutic support on gastrointestinal cancer patients undergoing surgery: survival results of a trial. Hepatogastroenterology 1999;46:322–335.

155. McCorkle R, Strumpf NE, Nuamah IF, et al. A specialized home care intervention improves survival among older post-surgical cancer patients. [see comments.]. J Am Geriatr Soc 2000;48(12):1707–1713.

156. Ilnyckyj A, Farber J, Cheang M, Weinerman B. A randomized controlled trial of psychotherapeutic intervention in cancer patients. Ann R Coll Physicians Surg Can 1994;27(2):93–96.

157. Cunningham AJ, Edmonds CVI, Jenkins GP, et al. A randomized controlled trial of the effects of group psychological therapy on survival in women with metastatic breast cancer. Psychooncology 1998;7:508–517.

158. Chen GE, Wu H, Ma J, et al. Toll-like receptor 4 engagement contributes to expression of NKG2D ligands by renal tubular epithelial cells. Nephrol Dial Transplant 2011;26(12):3873–3881.

159. Goodwin PJ, Leecz, M, Ennia, M, et al. The effect of group psychosocial support on survival in metastatic breast cancer. N Engl J Med 2001;345(24):1719–1726.

160. Kissane DW, Love A, Hatton A, et al. Effect of cognitive-existential group therapy on survival in early-stage breast cancer. J Clin Oncol 2004;22(21):4255–4260.

161. Kissane DW, Grabsch B, Clarke DM, et al. Supportive-expressive group therapy for women with metastatic breast cancer: survival and psychosocial outcome from a randomized controlled trial. Psychooncology 2007;16(4):277–286.

162. Linn MW, Linn BS, Harris R. Effects of counseling for late stage cancer. Cancer 1982;49:1048–1055.

163. Cunningham AJ, Edmonds CV, Jenkins GP, et al. A randomized controlled trial of the effects of group psychological therapy on survival in women with metastatic breast cancer. Psychooncology 1998;7(6):508–517.

164. Andersen J, Thorpe SM, King WJ, et al. The prognostic value of immunohistochemical estrogen receptor analysis in paraffin-embedded and frozen sections versus that of steroid-binding assays. Eur J Cancer 1990;26(4):442–449.

165. Giese-Davis J, Collie K, Rancourt KM, et al. Decrease in depression symptoms is associated with longer survival in patients with metastatic breast cancer: a secondary analysis. J Clin Oncol 2011;29(4):413–420.