Hypnosis and Clinical Pain

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Hypnosis has been demonstrated to reduce analogue pain, and studies on the mechanisms of laboratory pain reduction have provided useful applications to clinical populations. Studies showing central nervous system activity during hypnotic procedures offer preliminary information concerning possible physiological mechanisms of hypnotic analgesia. Randomized controlled studies with clinical populations indicate that hypnosis has a reliable and significant impact on acute procedural pain and chronic pain conditions. Methodological issues of this body of research are discussed, as are methods to better integrate hypnosis into comprehensive pain treatment.

After varying in popularity for the past century, interest in hypnosis has more recently been on the upswing. Evidence for a greater recent interest in hypnosis in psychology and health care is demonstrated in two trends in the literature. First, there has been an increased focus on hypnosis as interest in alternative, cost-saving therapies has grown. Although the notion that hypnosis is an alternative therapy can be disputed (Crasilneck, Stirman, & Wilson, 1955), recent evidence suggests that it can have an effective and cost-saving role in medicine. For example, Lang et al. (2000) demonstrated substantial cost savings in the operating room with hypnotic procedures. A second source of evidence for a resurgence of interest in hypnosis is the increasing presence of brain and neuroimaging studies of hypnosis. Studies of this nature have increased both in number and sophistication, as evidenced by Rainville, Duncan, Price, Carrier, and Bushnell's (1997) report on brain activity in response to hypnotic analgesia in *Science*.

Clinical pain is a problem that causes substantial suffering (Melzack, 1990) as well as billions of dollars in costs to society in areas such as health care and unemployment (Turk & Okifuji, 1998). Numerous studies have demonstrated the efficacy of hypnotic analgesia for reducing pain in the laboratory setting (E. R. Hilgard & Hilgard, 1975), and many case reports (e.g. J. Barber, 1977; B. Finer & Graf, 1968) have indicated significant reductions in clinical pain. However, relatively few randomized clinical studies on hypnotic analgesia have been published, and the extant reviews of this literature, although making important contributions

to the understanding of hypnotic analgesia, are limited. For example, J. Holroyd (1996) published a review on the use of clinical hypnosis for pain that included theoretical discussion of modulation, management, and hypnotizability, but her work included only a small sample of the randomized controlled studies available.

Chaves's writings have questioned the uncritical acceptance of some of the more dramatic claims that have been made about hypnosis over the past 2 centuries (Chaves, 1994; Chaves & Dworkin, 1997). He has also championed a cognitive–behavioral theoretical explanation for hypnotic analgesia and challenged many assumptions that are common to the field (Chaves, 1993). Although the writings of J. Holroyd (1996), Chaves, and others have raised many important hypotheses concerning hypnotic analgesia, none has included a systematic review of controlled trials of this treatment. In a recent meta-analysis, Montgomery, Du-Hamel, and Redd (2000) calculated 41 effect sizes from 18 published studies including hypnosis for pain control in both the laboratory and clinical settings. Eight of the 18 studies reviewed by Montgomery and his colleagues included patient populations—the majority of effect sizes came from studies of experimentally induced pain. Their findings indicate that hypnosis provided substantial pain relief for 75% of the populations studied. Montgomery et al. also concluded that the majority of the population (excluding those scoring in the low hypnotic suggestibility range) should obtain at least some benefit from hypnotic analgesia.

In conducting the present review, we sought to build on this previous body of research in a number of ways. Montgomery et al.'s (2000) meta-analysis looked at the hypnotic analgesia studies in aggregate and demonstrated that hypnosis reduces pain in most people under both clinical and experimental settings. Our review focuses primarily on the randomized, controlled clinical studies.

For the purposes of this review, we used Kihlstrom's (1985) definition of hypnosis as "a social interaction in which one person, designated the subject, responds to suggestions offered by another person, designated the hypnotist, for experiences involving alterations in perception, memory, and voluntary action" (p. 385). This definition is sufficiently broad to incorporate those studies which purport to examine the effects of hypnotic analgesia as well as specific enough to include a primary component of hypnosis, that is, suggestion. We specifically avoided studies that examined interventions that were not defined as hypnosis by the investigators even though they might have included suggestions (e.g., relaxation

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and biofeedback training often includes verbal suggestions for relaxation; "autogenic" training often includes verbal suggestions for comfort and pain-competitive experiences and sensations; imagery or distraction interventions often include suggestions for becoming absorbed in either external stimuli or internally generated images and sensations) unless these interventions were a control condition for a hypnotic intervention or were included as part of the hypnotic intervention and labeled as such by the investigator. The analysis of relaxation training, autogenic training, or imagery studies is beyond the scope of this review, particularly because there is not yet consensus that these interventions fit into the realm of hypnosis. In this review, we also examine the studies along such parameters as the type of pain treated (e.g., acute vs. chronic), study design, and the nature of the control group. In critically examining the studies in this area, we hope to determine the utility of hypnosis in clinical settings as well as the circumstances in which it seems to be most effective.

The article begins with a brief summary of the research on the effects of hypnosis on induced pain in the laboratory setting and theoretical explanations for hypnotic analgesia. The bulk of the review focuses on the controlled trials of hypnotic analgesia for clinical pain problems, including both acute (mostly procedural) pain and chronic pain. We end with a discussion of how hypnosis and hypnotic analgesia may be more effectively applied to chronic pain problems.

Laboratory Studies of Hypnotic Analgesia

Although there are important differences between pain induced in the laboratory in otherwise healthy volunteers and that associated with clinical conditions, analogue studies can provide an important theoretical foundation for understanding hypnotic analgesia. It is useful to discuss the findings of such analogue studies in terms of the general hypnotic theory that drove the investigator's work. For example, E. R. Hilgard and Hilgard (1975) described a number of studies that showed an association between standard measures of hypnotizability and response to hypnotic analgesia (e.g., Greene & Reyher, 1972). From this perspective, E. R. Hilgard and Hilgard's seminal work can be viewed in terms of the trait theory of hypnotizability that they were espousing at that time (M. B. Evans & Paul, 1970; Greene & Reyher, 1972). Specifically, through their work and that of subsequent investigators, hypnotic suggestibility[1] has been demonstrated to be a measurable construct that is highly stable in subjects even over a period of many years (i.e., .80–.90 test–retest correlations after 10 years; E. R. Hilgard & Hilgard, 1975). This body of research supports the view that there is great individual variability in responsiveness to hypnotic suggestions.

The trait theory of hypnosis has spawned numerous laboratory studies demonstrating an association between analgesia and hypnotic suggestibility. E. R. Hilgard and others have demonstrated that reduction in cold pressor pain (R. Freeman, Barabasz, Barabasz, & Warner, 2000; E. R. Hilgard, 1969; Miller, Barabasz, & Barabasz, 1991) and ischemic muscle pain perception (E. R. Hilgard & Morgan, 1975; Knox, Morgan, & Hilgard, 1974) are both related to suggestibility as measured by standardized scales. Mc-Glashan, Evans, and Orne (1969) also demonstrated an interaction between suggestibility and pain control, whereas those high in suggestibility show analgesia in response to hypnosis but not to placebo, and those low in suggestibility show the same (minimal) response to hypnosis as they do to a placebo. This study was consistent with E. R. Hilgard and Hilgard's (1975) assertion that hypnotic analgesia is not solely a function of placebo analgesia and that different mechanisms underlie responses to placebos and hypnosis (see also Stern, Brown, Ulett, & Sletten, 1977). M. B. Evans and Paul (1970) reported that suggestibility was such an important variable that waking suggestions for laboratory pain relief given without a hypnotic induction were as successful as those given within the context of an induction for subjects with high suggestibility scores. As mentioned above, Montgomery et al. (2000) recently reported a meta-analysis of the effects of hypnosis on pain. Consistent with the earlier findings of E. R. Hilgard and colleagues, they found that the effect size of hypnotic analgesia in the laboratory was associated with suggestibility across studies; subjects who scored high on measures of suggestibility during experimental pain paradigms (e.g., cold pressor tasks, painful heat stimuli) across a wide variety of settings tended to demonstrate larger responses to analgesia suggestions than subjects who scored low.

A second line of laboratory pain studies were conducted within the realm of social–cognitive views of hypnosis (T. X. Barber, Spanos, & Chaves, 1974; Chaves, 1989; Chaves & Barber, 1976; Spanos & Chaves, 1989a, 1989b, 1989c). Social–cognitive models include theories of hypnosis that suggest that the operative variables in hypnosis include contextual cues in the social environment, patient and subject expectancies, demand characteristics of the setting or situation, and role enactment (Kirsch & Lynn, 1995). Consistent with this view, experimental hypnotic analgesia has been found to be associated with contextual variables (Spanos, Kennedy, & Gwynn, 1984), instructional set (Spanos & Katsanis, 1989), and compliance (Spanos, Perlini, Patrick, Bell, & Gwynn, 1990). According to such social–cognitive models, neither hypnotic induction nor the existence of an altered state of consciousness are necessary for hypnotic responding, including responses to suggestions for pain relief (Chaves, 1993). Hypnotic analgesia is thought to reduce pain instead through cognitive–behavioral mechanisms, in which changes in cognitions are thought to alter the affective states associated with pain (Chaves, 1993). This conceptualization is consistent with the plethora of evidence that cognitive–behavioral interventions reduce both acute (Tan, 1982) and chronic clinical pain (Bradley, 1996; Holzman, Turk, & Kerns, 1986).

Theoretical approaches that maintain that hypnosis represents a unique or special cognitive process distinct from normal day-to-day cognitive processes have generated a different series of laboratory pain studies. Two such approaches are the neodissociative (E. R. Hilgard & Hilgard, 1975) and, more recently, "dissociated control" views (Bowers & LeBaron, 1986; E. R. Hilgard & Hilgard, 1975). The neodissociative model, originally proposed by E. R. Hilgard and Hilgard (1975), regards hypnosis as a state in which one or more forms of consciousness is split off from the rest

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[1] Recent work by Braffman and Kirsch (1999) indicates that the term *hypnotic suggestibility* more accurately describes the concept of hypnotizability and is henceforth used in this review. Because we limit our discussion primarily to the field of hypnosis, the terms *hypnotic suggestibility* and *suggestibility* are used interchangeably.

of mental processing. Although the neodissociative model is a general one used to describe multiple hypnotic phenomena, it was the work of E. R. Hilgard and Hilgard on pain control that largely fueled this theoretical approach. Earlier studies consistent with the neodissociation theory suggested that voluntary responses to induced pain, such as verbal reports of intensity, showed reduction with hypnosis, whereas involuntary indicators (e.g., heart rate) did not always change (T. X. Barber & Hahn, 1962; E. R. Hilgard, 1967, 1969; Shor, 1962; Sutcliffe, 1961). Such findings were also central to E. R. Hilgard and Morgan's (1975) hidden observer concept—that a part of consciousness can be split off from executive cognitive control and can respond to hypnotic suggestion.

The more recent dissociated control theory stresses the perceived automaticity of response under hypnosis. Bowers's (1992) dissociated control theory differs somewhat from neodissociation theory in that the former views dissociation as a process of keeping cognitive processes out of consciousness through amnesia or other means. Bowers and his colleagues maintained that subsystems of control in the brain can be activated directly rather than through higher level executive control. For example, Hargadon, Bowers, and Woody (1995) reported that consciously evoked pain strategies were not necessary for subjects to experience a reduction in laboratory induced pain. Similarly, Eastwood, Gaskovski, and Bowers (1998) reported that analgesia in the laboratory involved cognitive mechanisms that were effortlessly engaged. In other words, the strategies subjects used to reduce pain were evoked automatically without any type of conscious, thought-out strategy (Bowers, 1990, 1992). A number of investigators (Barabasz, 1982; Barabasz & Barabasz, 1989; R. Freeman et al., 2000; Miller et al., 1991; J. T. Smith, Barabasz, & Barabasz, 1996) have reported laboratory pain findings consistent with the theories of E. R. Hilgard and Hilgard (1975) or Bowers (1992).

More recent theorists have suggested that attempting to explain the effects of hypnosis solely in terms of one school of thought presents distinctions that are too arbitrary (Kihlstrom, 1992) and that, at the same time, seeming disparate theoretical orientations about hypnosis have a surprising degree of commonality in many cases (Kirsch & Lynn, 1995). However, the findings from these studies that were originally designed to test different theories of hypnosis raise important hypotheses concerning the conditions under which pain control might be optimized in the clinical situation. For example, studies supporting a trait model of hypnotic suggestibility indicate that highly suggestible patients would be more likely to respond to suggestions for analgesia. As we discuss later, there are several studies that support an association between suggestibility and clinical hypnotic analgesia (Harmon, Hynan, & Tyre, 1990; J. T. Smith et al., 1996; ter Kuile, Spinhoven, Linssen, Zitman, Van Dyck, & Rooijmans, 1994). The findings from studies testing social–cognitive models suggest that, because the patient's expectations for pain relief is a critical variable, treatment effects can be maximized by capitalizing on this element of the social interaction. Such theoretical work also suggests that identifying the patient's cognitive style and his or her thoughts about pain and then targeting hypnotic suggestions to alter these cognitions should facilitate hypnotic analgesia (Chaves, 1993). Supporting the potential benefit of suggestions that target cognitions in hypnotic analgesia are studies in which subjects have been shown to engage in self-generated cognitive strategies to reduce pain even in the absence of specific suggestions for this (Chaves & Barber,

1974; Chaves & Brown, 1987). Furthermore, Chaves (1989) has pointed out that "catastrophizing" subjects tend to amplify the negative effects of pain. Whereas social–cognitive models might indicate that patients obtain pain relief by concentrating on their thoughts and restructuring them, dissociated control models are more useful in explaining those instances in which hypnotic pain relief seems to come effortlessly to patients. Subjects or patients that appear to respond easily to the hypnotist's suggestions, often perhaps with amnesia for the experience, would be showing the types of behaviors consistent with this model (Patterson, 2001).

Physiological Correlates of Laboratory Pain Reduction

Hypnosis researchers have long sought specific physiological indicators of the hypnotic state. Much of the early research in this area was fueled by investigators seeking to confirm that the identification of a specific physiological indicator of hypnosis would lend support to the view that hypnosis is a state of consciousness distinct from other states, such as waking or sleep (Dixon & Laurence, 1992). Although some findings from this research have been helpful to determine what hypnosis is not (e.g., cortical activity during hypnosis is unlike cortical activity during sleep; Dynes, 1947), no physiological indicator has been identified that consistently shows characteristics unique to hypnosis. However, some of this research has identified interesting and consistent physiological correlates of hypnotic analgesia. The physiological responses to hypnotic analgesia that have been studied include sympathetic responses (heart rate and blood pressure), electrocortical activity (including the assessment of brain wave patterns at various sites and cortical evoked potentials), possible hypnotic analgesia-related release of endorphins, and regional brain blood flow.

Sympathetic Responding

Some of the first physiological responses to be studied in hypnosis research were sympathetic in nature such as heart rate and galvanic skin responses. However, although decreases in heart rate and blood pressure are sometimes found with hypnosis (De Pascalis & Perrone, 1996; E. R. Hilgard & Morgan, 1975; Lenox, 1970), more often involuntary sympathetic responses to pain are not altered by hypnotic analgesia (T. X. Barber & Hahn, 1962; E. R. Hilgard, 1967, 1969; Shor, 1962; Sutcliffe, 1961; but see Rainville, Carrier, Hofbauer, Bushnell, & Duncan, 1999, for evidence suggesting a possible link between heart rate and *pain unpleasantness,* or the affective component of pain). Because physiological responses to painful stimuli may be less influenced by subject bias than self-report, some might conclude from the lack of consistent effect on heart rate and blood pressure that hypnosis does not affect actual experienced pain but only a person's willingness to report that pain. However, as E. R. Hilgard and Hilgard (1975) made clear, the effects of hypnosis on heart rate and blood pressure only speak to the effects of hypnosis on a subset of physiological responses to pain; they say nothing about the effects of hypnosis on pain experience.

Endogenous Opioid and Acupuncture Studies

Given the ability of humans to modulate pain experience through endogenous opioids (Melzack & Wall, 1973), it would be

reasonable to test whether hypnotic analgesia might operate by influencing endogenous opioid levels. This hypothesis has been tested in at least two studies in which the opioid antagonist naloxone was introduced after hypnotic analgesia was initiated (J. Barber & Mayer, 1977; Goldstein & Hilgard, 1975). In both studies, naloxone failed to reverse the effects of hypnotic analgesia. These findings suggest that endogenous opioids may not be responsible for hypnotic analgesia. However, with only two studies, it may be premature to rule out a role for endogenous opioids in hypnotic analgesia. Research has also shown that response to hypnosis does not correlate with response to acupuncture (Knox, Gekoski, Shum, & McLaughlin, 1981; Knox, Handfield-Jones, & Shum, 1979; Knox & Shum, 1977), suggesting that the underlying mechanisms for these two forms of analgesia may be different.

Evoked Potential Studies

The findings from electrocortical studies have shown some specific physiological correlates of hypnotic analgesia. For example, the late evoked potential (roughly 300–400 ms after the stimulation), measured at the scalp, has been shown to be associated with the level of reported pain intensity and, like perceived pain intensity, is influenced by cognitive factors such as attention and degree to which the stimuli are expected (Chen, Chapman, & Harkins, 1979; Stowell, 1984). A number of studies have shown reductions in late somatosensory potentials evoked by nociceptive stimuli after hypnosis (Arendt-Nielsen, Zachariae, & Bjerring, 1990; Barabasz & Lonsdale, 1983; Crawford et al., 1998; Danziger et al., 1998; De Pascalis, Magurano, & Bellusci, 1999; Halliday & Mason, 1964; Meier, Klucken, Soyka, & Bromm, 1993; Meszaros, Banyai, & Greguss, 1980; D. Spiegel, Bierre, & Rootenberg, 1989; Zachariae & Bjerring, 1994). Thus, these studies support an effect of hypnotic analgesia on a physiological response that is both (a) linked to perceived pain intensity and (b) not under conscious control. Unfortunately, however, these studies do not identify the specific physiological substrates involved in hypnotic analgesia. Also, these studies on evoked potentials, indeed many studies on hypnotic analgesia, do not disentangle the influence of suggestion from the hypnotic context—it is possible that these same effects on evoked potential could be obtained with analgesia suggestions alone (e.g., not only when suggestions are made after an induction or in a situation when the suggestions are not labeled as hypnosis).

Electroencephalogram (EEG) Studies

Surface EEG recordings made during hypnotic analgesia have also yielded some interesting findings. Crawford (1990) assessed EEG correlates of cold pressor pain under conditions of waking and hypnosis in persons with high versus low hypnotic suggestibility scores. She found significantly greater theta activity (5.5–7.5 Hz) among those subjects with high suggestibility scores than among those with low scores during the hypnotic analgesia condition, especially in the anterior temporal region. Although those with low scores showed little hemispheric differences during the experimental conditions, the highly suggestible subjects showed greater left hemisphere dominance during the pain condition and a reversal in hemispheric dominance during hypnotic analgesia (see also De Pascalis & Perrone, 1996). Crawford (1994) has maintained that persons who are highly suggestible demonstrate greater

cognitive flexibility and abilities to shift from left to right anterior functioning than do those who are less suggestible. She concluded that hypnosis may operate via attention filtering and that the fronto-limbic system is central to this process. However, the fact that suggestions for focused analgesia are as effective (or more effective) than dissociative imagery to reduce pain (De Pascalis, Magurano, Bellusci, & Chen, 2001) poses a problem for the interpretation that hypnotic analgesia operates solely via attention mechanisms and suggests that the specific mechanisms involved may depend on the specific type of suggestion given.

Brain Imaging Studies

Although EEG studies of evoked potentials and brain wave patterns do not provide information about the specific neuroanatomical sites at which the modulation of pain experience occurs (Price & Barrell, 2000), studies using positron emission tomography (PET) can provide a more precise analysis of these physiological substrates. Rainville et al. (1997) used PET scans to study brain activity of subjects exposed to hot water pain before, during, and after hypnotically induced analgesia for the unpleasantness, but not the intensity, of a noxious stimulus. Their results indicated that hypnosis-related changes in the affective dimension of pain were associated with changes in cortical limbic regional activity (anterior cingulate cortical area 24) but not with changes in the primary somatosensory cortex. In a second study using PET methodology, Hofbauer, Rainville, Duncan, and Bushnell (2001) demonstrated that suggestions for sensory analgesia resulted, at least in part, in a reduction in activity in the somatosensory cortex. In review, Price and Barrell (2000) concluded that hypnotic analgesia can produce both an inhibition of afferent nociceptive signals arriving at the somatosensory cortex and a modulation of pain affect by producing changes in the limbic system (e.g., anterior cingulate cortex; see also Kroptov, 1997).

Possible Inhibition at the Spinal Cord Level

There is evidence that hypnotic analgesia may also operate, at least to some degree, through inhibition at the level of the spinal cord. Support for this mechanism comes from a variety of research studies that demonstrate hypnotically induced reductions in skin reflex on the arm (Hernandez-Peon, Dittborn, Borlone, & Davidovich, 1960), nerve response in the jaw (Sharav & Tal, 1989), and muscle response in the ankle (J. Holroyd, 1996; Kiernan, Dane, Phillips, & Price, 1995). The study by Kiernan and colleagues (1995) has received particular attention because it demonstrates that suggestions for analgesia were correlated with the spinal nociceptive (R-III) reflex, a response that has little to do with higher order central nervous system processing. More recently, Danziger and colleagues (1998) found two distinct patterns of R-III reflex associated with hypnotic analgesia. Using a methodology similar to that of Kiernan et al., these investigators found that 11 subjects showed strong inhibition, and 7 showed strong facilitation of the R-III reflex with hypnosis. Although the reasons for such differences in response are not easily explained, they do indicate that highly suggestible individuals show a marked change in R-III reflex when given hypnotic analgesia suggestions. As pointed out by J. Holroyd (1996), hypnotic effects on nervous system inhibition at the level of the spinal cord have also been

demonstrated by alterations in galvanic skin response (Gruzelier, Allison, & Conway, 1988; West, Niell, & Hardy, 1952). Unfortunately, however, these are limited by the absence of control groups with nonhypnotized patients, as are many studies on the physiological effects of hypnosis. This limits the inferences that can be drawn about the effects of hypnosis (vs. suggestions made outside of a hypnotic context) on physiological responses to hypnotic analgesia.

Sensory Versus Affective Pain Effects

Several recent studies have focused on whether hypnotic analgesia has a greater effect on sensory or affective components of pain. It is understandable that there has been speculation that affective components of pain, which are thought to have a greater cognitive–evaluative component, might be more responsive to hypnosis than sensory components, which are presumably more closely associated with nociceptive input. In one of the earlier studies that examined this question, Price, Harkins, and Baker (1987) reported that affective components of pain showed a greater reduction with hypnosis than did sensory ones. However, another study by Price and Barber (1987), showed that both components could show a reduction, and that the amount of change depended on the nature of suggestion. Further support for the hypothesis that the effects of hypnotic analgesia on pain sensation versus pain affect depend on the specific suggestions given comes from Rainville et al.'s (1999) brain imaging work, which shows that brain activity also varies as a function of the nature of analgesic suggestion. In short, the recent evidence does not support the hypothesis that hypnotic analgesia necessarily impacts affective pain to a greater extent than sensory pain. However, this research has demonstrated the importance of the wording of the analgesic suggestions and that subjects can respond to suggestions that are targeted toward distinct elements of pain.

In summary, the research on neurophysiological correlates of hypnotic analgesia suggests that highly suggestible subjects show different patterns of cortical responding than do those who score low on measures of suggestibility. Research also shows that individuals engaged in successful hypnotic analgesia invoke physiological inhibitory processes in the brain. Suggestions for sensory reductions in pain show corresponding changes in activity in the somatosensory cortex, whereas suggestions for affective pain reduction are reflected in the part of the brain that corresponds to processing emotional information. Another line of research suggests that successful inhibition of pain through hypnosis may also occur, at least in part, through descending (spinal) inhibitory mechanisms. However, the lack of nonhypnotic control conditions in much of this research prohibits conclusions regarding the impact of hypnosis versus nonhypnotic suggestions on physiological responding. Perhaps what can best be concluded from this body of research is that neurophysiological changes are associated with hypnotic analgesia in receptive subjects and that multiple physiological mechanisms appear to play a role in the pain reduction associated with hypnotic suggestions for pain relief.

Anecdotal and Clinical Reports

There are many anecdotal reports and case studies that support the use of hypnosis for a wide variety of clinical pain conditions.

Perhaps the most time honored of these are those of Esdaile (1957), a Scottish physician, who reported on 345 major operations performed in India in the nineteenth century with hypnosis (termed *mesmerism* at that time) as the sole anesthetic. Similarly, E. R. Hilgard and Hilgard (1975) listed at least 14 different types of surgeries (cited by multiple investigators) for which hypnosis was used as the sole anesthetic, including appendectomies, gastrostomies, tumor excisions, and vaginal hysterectomies. Rausch (1980) reported undergoing a cholecystectomy using self-hypnosis and being able to walk consciously back to his room immediately after the procedure. Burn injuries are another source of severe pain for which there are multiple reports of good patient response to hypnosis (Patterson, Questad, & Boltwood, l987; Gilboa, Borenstein, Seidman, & Tsur, 1990), and B. L. Finer and Nylen (1961) reported bringing a patient through several extensive burn surgeries with hypnosis as the sole anesthetic. Other case studies have described a wide variety of problems that have responded to hypnosis, including pain associated with dental work (J. Barber, 1977; J. Barber & Mayer, 1977; Hartland, 1971), cancer (J. R. Hilgard & LeBaron, 1984), reflex sympathetic dystrophy (Gainer, 1992), acquired amputation (Chaves, 1986; Siegel, 1979), childbirth (Haanen et al., 1991), spinal cord injury (M. Jensen & Barber, 2000), sickle cell anemia (Dinges et al., 1997), arthritis (Appel, 1992; Crasilneck, 1995), temporomandibular joint disorder (Crasilneck, 1995; Simon & Lewis, 2000), multiple sclerosis (Dane, 1996; Sutcher, 1997), causalgia (B. Finer & Graf, 1968), lupus erythematosus (S. J. Smith & Balaban, 1983), postsurgical pain (Mauer, Burnett, Ouellette, Ironson, & Dandes, 1999), and unanesthetized fracture reduction (Iserson, 1999). Other types of pain problems reported to respond to hypnotic analgesia include low back pain (Crasilneck, 1979, 1995), headaches (Crasilneck, 1995; Spinhoven, 1988), and mixed chronic pain (F. J. Evans, 1989; Jack, 1999; Sacerdote, 1978). Even this long list of pain etiologies is by no means exhaustive. In short, hypnosis has been reported to be useful for virtually every clinical pain problem imaginable.

However, the many limitations of case reports are well known, including potential subjective bias from the clinician and patient, potential spontaneous remission, placebo effects, and selective reporting of only the most successful cases (Campbell & Stanley, 1963). All of these drawbacks severely limit any conclusions that may be drawn from the anecdotal reports and case studies of hypnotic analgesia. Even the frequently cited findings of Esdaile (1957) and the hypnotic analgesia–surgery literature have been called into question (T. X. Barber et al., 1974; Chaves, 1993; Dingwall, 1967; Spanos, 1986). Furthermore, Chaves and Dworkin (1997) have argued that patients can also demonstrate extraordinary pain control without hypnosis and that contentions that such patients show no pain under hypnosis are often false.

A number of other additional methodological problems are specific to published hypnosis case reports, including the failure to include validated measures of pain, hypnotic suggestibility, and levels of pain medication used by the patients. Another shortcoming is that consecutive patients often are not subjected to hypnotic treatment; patients often appear to be selectively treated and reported on without a description of the decision rules used to select the cases. Because of these limitations, the best and only conclusion we can make from these clinical case studies is that there appear to be some individuals with clinical pain problems who

may benefit from hypnotic analgesia. Unfortunately, however, the available case study evidence does not allow us to determine whether this group of responders represents an exception or the norm.

Controlled Clinical Studies

Acute Pain

As mentioned above, randomized controlled studies have largely been absent from the clinical hypnosis literature, although a welcome increase has occurred over the past 2 decades. A difficulty in this literature is that the nature of the pain problems treated are rarely discussed in detail. Of particular concern, the important distinction between acute and chronic pain is seldom mentioned. When the research is considered with this distinction in mind, it becomes clear that the two types of pain represent dramatically different treatment issues.

Acute pain may be defined as that which occurs in response to tissue damage (Melzack & Wall, 1973; Williams, 1999). In most of the reports in this area, hypnosis is applied to acute pain associated with a medical procedure. Table 1 summarizes the findings, and Table 2 describes the hypnotic interventions that were used in the 19 controlled studies that have been published on the effects of hypnosis on acute pain, organized by the type of pain. We have indicated in Table 1 whether the study included an adult or child sample, whether a measure of hypnotic suggestibility was included, the nature of the control group (or comparison groups), whether the subjects were randomly assigned to treatment condition, the outcome dimensions assessed, and the findings concerning any differences found between the hypnosis and control conditions.

Through MEDLINE and PsycINFO searches using the key words *hypnotic analgesia*, *hypnosis*, and *pain*, and through a careful review of the citations of previous review articles and the articles themselves, we were able to identify the published studies listed in Tables 1 and 2 that examined the effects of hypnosis on acute pain, including pain from invasive medical procedures (included in this category is one study [Syrjala, Cummings, & Donaldson, 1992] that examined the effects of hypnosis for painful oral mucositis, which is one of the results of chemotherapy and total body irradiation done in preparation for marrow transplantation in some persons with cancer), burn care, and childbirth.

Invasive medical procedure pain. Weinstein and Au (1991) compared 16 patients who received presurgery hypnosis and then underwent angioplasty with 16 patients who received standard care. The hypnotic intervention was based on a modification of the induction reported by J. Barber (1977). Relative to the control group, patients in the hypnosis group showed a (statistically insignificant, $p = .10$) 25% increase in the time that they allowed the cardiologist to keep the balloon catheter inflated during the surgery and a statistically significant reduction in the opioid analgesics required during the procedure. The hypnosis group also showed a significant decrease in catecholamine blood levels relative to the control group. However, the experimental group did not demonstrate changes in other physiological variables measured including blood pressure or pulse.

Lambert (1996) randomly assigned 52 children (matched for age, sex, and diagnosis) to either an experimental group that received both hypnosis and guided imagery or a control group in which each child spent an equal amount of time discussing the surgery and topics related to the child's interests. The experimental treatment involved a single 30-min session 1 week before the surgery that included suggestions for relaxation based on an image selected by the child followed by suggestions for positive surgical outcomes and minimal pain. The therapist was not present during the surgery. The experimental group rated their pain as significantly lower than the control group did. However, although anxiety scores decreased in the experimental group and increased in the control group, mean postsurgery anxiety scores did not differ between groups. The experimental group also showed shorter hospital stays, but the groups did not differ on length of surgery, anesthesia, or time in postanesthesia care.

Faymonville et al. (1997) randomly assigned a group of patients undergoing elective plastic surgery while sedated to receive either hypnosis ($n = 31$) or a stress-reducing physiological technique ($n = 25$) by the treating anesthesiologist. According to the authors, "a hypnotic state was . . . induced using eye fixation, muscle relaxation, and permissive and indirect suggestions. The exact words and details of the induction technique . . . depended on the anesthesiologist's observation of patient behavior" (Faymonville et al., 1997, p. 362). However, the authors stated that the word *hypnosis* was never used to describe that treatment to the study participants. Patients in the control group received continuous stress reduction strategies including "deep breathing and relaxation . . ., positive emotional induction . . . and cognitive coping strategies (imaginative transformation of sensation or imaginative inattention)" (Faymonville et al., 1997, p. 362). Patients in the hypnosis group required significantly less analgesia (alfentanil) and sedation (midazolam), reported better perioperative pain and anxiety relief, higher levels of satisfaction, greater perceived control, lower blood pressure, heart rate, and respiratory rate, and lower postoperative nausea and vomiting. Surgeons of patients in the experimental condition also reported observing higher levels of satisfaction in patients than surgeons of patients in the control condition. Despite the positive effects of the hypnosis intervention reported, there are several aspects of this study that make the interpretation of the findings difficult. First, because the hypnosis intervention was never defined as such to the patients, this intervention differs from most others tested in which the intervention was presented as hypnosis. It is not entirely clear what effect, if any, labeling the intervention as hypnosis might have had on the outcome. In addition, the differences between the hypnosis and the stress-reducing intervention are not entirely clear in this study. Patients in both conditions appear to have been given suggestions (although the specific suggestions given to each group did differ). Finally, the findings are further complicated by the fact that the treating anesthesiologist provided all interventions and was aware of the study conditions.

Lang and her colleagues have reported two studies on hypnosis for invasive medical procedures. In the first (Lang, Joyce, Spiegel, Hamilton, & Lee, 1996), 16 patients were randomized to an experimental group that received "combined elements of relaxation training and guided imagery for induction of a self-hypnotic process" (p. 109). Relative to 14 patients in a standard treatment control, hypnosis patients used less pain medication, reported less maximal pain (but not average pain), and showed more physiologic stability during the procedures (primarily diagnostic arterio-

Table 1
Description of Controlled Studies of Acute and Procedural Pain Hypnotic Treatment

Study and type of acute pain	Hypnotizability assessed?	N	Randomized?	Control conditions	Adult or child?	Outcome dimensions	Findings
Zeltzer & LeBaron (1982) Bone marrow aspiration pain	No	33	Yes	Deep breathing and distraction (DBD)	Child (6–17 years)	Patient-rated pain intensity Patient-rated anxiety Observer-rated pain intensity Observer-rated anxiety	H > DBD H > DBD H > DBD H > DBD
Katz et al. (1987) Bone marrow aspiration pain	No	36	Yes	Nondirected play (NDP)	Child (6–11 years)	Observed distress; PBRS–R Nurse-rated anxiety Patient-rated fear Patient-rated pain Therapist-rated rapport Therapist-rated response to hypnosis	H = NDP H = NDP H = NDP H = NDP H = NDP H = NDP
Kuttner (1988) Bone marrow aspiration pain	No	25	Yes	Standard care (SC), distraction (D)	Child (3–6 years)	Observed distress; PBRS–R Observer-rated anxiety Patient-rated pain Patient-rated anxiety	H > SC; H > D H > SC; H > D H > SC; H > D H = SC = D H = SC = D
Liossi & Hatira (1999) Bone marrow aspiration pain	Yes; Stanford Hypnotic Clinical Scale for Children	30	Yes	Cognitive–behavioral therapy (CBT), SC	Child (5–15 years)	Observed distress; PBCL Patient-rated pain intensity Patient-rated anxiety	H > CBT > SC (H = CBT) > SC H > CBT > SC
Wakeman & Kaplan (1978) Burn wound dressing change and debridement pain	No	42	No	Attention control (AC)	Both (7–70 years)	Percentage of allowable medication use during study participation	H > AC
Patterson et al. (1989) Burn wound dressing change and debridement pain	No	13	No	SC	Adult	Patient-rated pain intensity	H > SC
Patterson et al. (1992) Burn wound dressing change and debridement pain among burn patients	No	30	Yes	SC, AC	Adult	Morphine equivalents for administered pain medications Patient-reported pain Nurse-rated pain	H = SC = AC H > (SC = AC) H > (SC = AC)
Everett et al. (1993) Burn wound dressing change and debridement pain	No	32	Yes	AC, lorazepam (L)	Adult	Patient-rated pain intensity Patient-rated anxiety Nurse-rated patient pain intensity Nurse-rated patient pain anxiety	(H + L) = (H) = (AC + L) = (L) (H + L) = (H) = (AC + L) = (L) (H + L) = (H) = (AC + L) = (L) (H + L) = (H) = (AC + L) = (L)
Patterson & Ptacek (1997) Burn wound dressing change and debridement pain	No	61	Yes	AC	Adult	Self-reported worst pain intensity Nurse-reported worst patient pain intensity Patient-rated effectiveness of hypnosis Opioid intake	H = AC (among subjects with high pain, H > AC) H > AC H = AC H = AC

(table continues)

Table 1 (continued)

Study and type of acute pain	Hypnotizability assessed?	N	Randomized?	Control conditions	Adult or child?	Outcome dimensions	Findings
Wright & Drummond (2000) Burn wound dressing change and debridement pain	No	30	Yes	SC	Both (16–48 years)	Medication consumption During-procedure pain intensity During-procedure pain unpleasantness Post-procedure pain intensity Post-procedure pain unpleasantness Pre- to postprocedure change in patient-rated relaxation	H > SC H > SC H > SC H > SC H > SC H > SC
Davidson (1962) Labor pain	No	210	No	SC, relaxation training (RT)	Adult	Duration of labor Patient-rated pain in the first stage Patient-rated pain in the second stage Analgesia intake Patient-rated pleasantness of labor	H > (RT = SC) H > (RT = SC) H > (RT = SC) H > (RT = SC) H > (RT = SC)
R. M. Freeman et al. (1986) Labor pain	Yes; Stanford Hypnotic Clinical Scale for Adults	65	Yes	SC	Adult	Duration of pregnancy Duration of labor Analgesic intake Mode of delivery Pain relief Satisfaction with labor	H longer than SC by 0.06 weeks H longer than SC by 2.7 hr H = SC H = SC H = SC H > SC ($p = .08$)
Harmon et al. (1990) Labor pain	Yes; Harvard Group Scale of Hypnotic Susceptibility, Form A	60	Yes	Breathing and relaxation exercises (BR)	Adult	Length of Stage 1 labor Length of Stage 2 labor Newborn Apgar, 1 min Newborn Apgar, 5 min Spontaneous delivery (%) Percent given medications MMPI Depression Scale score Pain intensity; MPQ Sensory pain; MPQ Affective pain; MPQ Evaluative pain; MPQ Miscellaneous pain; MPQ	H > BR H = BR H > BR H > BR H > BR H > BR H = BR (among subjects with high pain, H > BR) H > BR H > BR H > BR H > BR H > BR
Weinstein & Au (1991) Pain during angioplasty	No	32	Yes	SC	Adult	Pulse Systolic blood pressure (BP) Diastolic BP Total time of balloon inflation during procedure Requests for additional medicine Catecholamine levels	H = SC H = SC H = SC H = SC H > SC H > SC
Syrjala et al. (1992) Pain following chemotherapy for cancer	No	45	Yes	CBT, AC, SC	Adult	Oral pain Nausea Presence of emesis Opioid intake	H > (AC = CBT) H = AC = CBT = SC H = AC = CBT H = AC = CBT

Table 1 (*continued*)

Study and type of acute pain	Hypnotizability assessed?	N	Randomized?	Control conditions	Adult or child?	Outcome dimensions	Findings
Lang et al. (1996) Mixed invasive medical procedures—primarily diagnostic arteriograms	Yes; Hypnotic Induction Profile	30	Yes	SC	Adult	Self-administration of analgesics	H > SC
						BP increase	H = SC
						Heart rate increase	H = SC
						Oxygen desaturation during procedure	H > SC
						Procedural interruptions due to hemodynamic instability	H > SC
						Patient-rated pain intensity	H = SC
						Patient-rated maximal pain	H > SC
						Patient-rated anxiety; BAI	H = SC
Faymonville et al. (1997) Elective plastic surgery	No	56	Yes	Emotional support (ES)	Adult	Analgesic requirements	H > ES
						Perioperative patient-rated anxiety	H > ES
						Patient-rated pain intensity	H > ES
						Patient-rated level of control	H > ES
						Observed complaints during surgery	H > ES
						Diastolic BP	H > ES
						Maximum decrease in SpO2	H > ES
						Maximum increase in heart rate	H > ES
						Maximum increase in respiratory rate	H > ES
						Maximum increase in systolic BP	H > ES
						Maximum increase in cutaneous temperature	H = ES
						Patient-rated surgery satisfaction	H > ES
						Observer-rated surgical comfort	H > ES
						Postoperative nausea and vomiting	H > ES
						Surgeon's satisfaction	H > ES
Lambert (1996) Variety of surgical procedures	No	52	Yes	AC	Child (7–19 years)	Patient-rated pain	H > AC
						Patient-rated postoperative anxiety; STAIC	H > AC
						Length of surgery	H = AC
						Length of hospital stay	H > AC
						Length of anesthesia	H = AC
						Time in postanesthesia care unit	H = AC
						Medication consumption	H = AC
Lang et al. (2000) Variety of surgical procedures including arterial and venous surgery and nephrostomy	No	241	Yes	SC, AC	Adult	Patient-rated pain intensity	H > (AC = SC)
						Patient-rated anxiety	H > SC; H = AC; AC = SC
						Medication use	(H = AC) > SC
						Time needed for procedure	H > SC; H = AC; AC = SC
						Hemodynamic stability	H > (AC = SC)

Note. H = hypnosis alone; PBRS–R = Procedural Behavior Rating Scale—Revised; PBCL = Procedural Behavior Checklist; MMPI = Minnesota Multiphasic Personality Inventory; MPQ = McGill Pain Questionnaire; BAI = Beck Anxiety Inventory; SpO2 = Oxygen saturation; STAIC = State–Trait Anxiety Inventory for Children.

Table 2
Description of Hypnotic Treatment: Acute and Procedural Pain Studies

Study	Manualized?	Described as hypnosis to subjects?	Audiotaped?	Description of intervention
Zeltzer & LeBaron (1982)	No	Unclear	No	Suggestions to become increasingly involved in interesting and pleasant imagery. Therapist present during procedures.
Katz et al. (1987)	No	Unclear	No	Two sessions prior to the procedures plus 20-min sessions immediately before each of three procedures. Sessions began with eye fixation, which was followed by suggestions for relaxation, pain reduction, reframing pain, distraction, positive affect, and mastery. Posthypnotic suggestions for practicing and reentering hypnosis with a cue from the therapist during the procedure. Therapist was present during procedures, but interactions were limited to the provision of the cue (hand on shoulder) and brief encouraging statements.
Kuttner (1988)	No	Unclear	No	Suggestions to become involved with a favorite story that incorporated reinterpretations of the procedural noxious experience. Therapist present and provided intervention during procedure.
Liossi & Hatira (1999)	No	Unclear	No	Suggestions for relaxation, well-being, self-efficacy, and comfort followed by suggestions for numbness, topical anesthesia, local anesthesia, and glove anesthesia transferred to the low back were finished with posthypnotic suggestions that the hypnotic experience would be repeated during the procedure. Therapist was present during procedure, but interactions were limited to cue for subject to use the skills learned and to brief verbal encouragements.
Wakeman & Kaplan (1978)	No	Yes	No	Procedures varied. They typically included initial eye fixation and eye roll followed by suggestions for relaxation and other suggestions tailored for individual subjects such as analgesia, anesthesia, dissociation, and reduction of anxiety. Subjects were instructed to use self-hypnosis when therapist was not present. Therapist was present during procedures and other regularly scheduled times until "self-hypnosis was mastered" (p. 4)
Patterson et al. (1989)	No	Yes	No	J. Barber's (1977) rapid induction analgesia, which includes suggestions for relaxation, imagining 20 stairs for deepening, and posthypnotic suggestions for comfort, relaxation, analgesia, and anesthesia, was used during the procedures. Intervention was performed 10 min to 3 hr prior to wound debridement, and therapist was not present during procedure.
Patterson et al. (1992)	No	Yes	No	J. Barber's (1977) rapid induction analgesia was used during the procedures. Intervention was performed prior to wound debridement, and therapist was not present during procedure.
Everett et al. (1993)	No	Yes	No	J. Barber's (1977) rapid induction analgesia was used during the procedures. Intervention was performed prior to wound debridement, and therapist was not present during procedure.
Patterson & Ptacek (1997)	No	Yes	No	J. Barber's (1977) rapid induction analgesia was used during the procedures. Intervention was performed prior to wound debridement, and therapist was not present during procedure.
Wright & Drummond (2000)	No	Yes	No	J. Barber's (1977) rapid induction analgesia was used during the procedures. Intervention was performed immediately prior to wound debridement, and therapist was not present during procedure.
Davidson (1962)	No	Unclear	No	Six sessions of group training, which included eye fixation followed by suggestions for relaxation, normality of pregnancy and labor, diminished awareness of pain and need for analgesics, ability to produce anesthesia of the perineum at birth, and satisfaction and pleasure after childbirth. Therapist was sometimes present to provide intervention during labor.
R. M. Freeman et al. (1986)	No	Yes	No	Weekly group sessions prior to labor providing suggestions for relaxation, pain relief, and transfer of warmth from hand to abdomen. Subjects were also seen individually weekly from 32 weeks after gestation until birth. Therapist was not present during labor.
Harmon et al. (1990)	No	Yes	Yes	Suggestions for relaxation, heaviness, deep breathing, backward counting, enjoyment of childbirth delivery, and numbness. Sessions were taped, and subjects were asked to listen to tapes daily prior to delivery (average number of listenings = 23).
Weinstein & Au (1991)	No	Yes	No	Suggestions for relaxation followed by posthypnotic suggestions for relaxation during angioplasty the next morning. Suggestions were based on J. Barber's (1977) scripted induction. Clinician available to assist with relaxation during procedure if necessary.

Table 2 (*continued*)

Study	Manualized?	Described as hypnosis to subjects?	Audiotaped?	Description of intervention
Syrjala et al. (1992)	No	Yes	Yes	Two pre-inpatient training sessions that included suggestions for relaxation and imagery tailored to patient's preference (visual, auditory, kinesthetic) and suggestions for analgesia, nausea reduction, well-being, and self-control. Initial sessions were followed by 10 inpatient sessions provided following chemotherapy. All sessions were taped, and subjects were encouraged to listen to the tapes daily through the 20 days following chemotherapy.
Lang et al. (1996)	No	No	No	Relaxation followed by suggestions for imagery of self in nature and for pain competitive sensations. Therapist spent varying amounts of time with patients during procedures.
Faymonville et al. (1997)	No	No	No	Eye fixation followed by suggestions for relaxation and additional indirect suggestions to relive a pleasant life experience (no analgesic suggestions were given). Therapist present during surgery.
Lambert (1996)	No	Unclear	No	One 30-min session 1 week prior to surgery that included suggestions for relaxation using imagery to rehearse impending operation followed by suggestions for positive surgical outcomes and minimal pain. Therapist was not present during surgery.
Lang et al. (2000)	Yes	No	No	Suggestions for relaxation or (for the final 53 hypnosis patients) eye roll, eye closing, and deep breathing followed by suggestions of the sensation of floating followed by self-generated imagery of a safe and pleasant experience. Intervention performed during surgery.

grams). Differences in anxiety ratings were not statistically significant, nor were differences in blood pressure or heart rate increases during the procedures. In addition, treatment benefits did not correlate with suggestibility as measured by the Hypnotic Induction Profile (H. Spiegel & Spiegel, 1978). A limitation of the study is that the clinicians were aware of the patients' group assignments.

More recently, Lang et al. (2000) randomly assigned 241 patients undergoing cutaneous vascular and renal procedures to standard care ($n = 79$), structured attention ($n = 80$), or self-hypnotic relaxation ($n = 82$). Structured attention involved eight key components described in a treatment manual cited by the authors, and hypnosis involved these key components plus a hypnotic induction followed by suggestions for the patients to imagine themselves in a safe and pleasant environment during the procedure. Procedure times were shorter and hemodynamic stability was greater in the hypnosis group relative to the attention control group. Both the attention and hypnosis treatments showed less drug use than did the standard care condition. This study is remarkable because it is one of the few studies in this area that used manualized treatment. Moreover, fidelity of the treatment intervention was established through a video coding system, and the multiple outcome measures included one that demonstrated cost savings (i.e., length of procedures).

As part of preparation for bone marrow transplantation, patients receive supralethal doses of chemotherapy often followed by supralethal doses of total body irradiation. This treatment often results in severe nausea and vomiting and pain from oral mucositis that can last from several days to 3 weeks. Syrjala et al. (1992) reported a randomized controlled study of the effects of hypnosis and a cognitive–behavioral intervention, relative to two control conditions, on these symptoms during 20 days after chemotherapy and irradiation. The cognitive–behavioral intervention included cognitive restructuring, information, goal development, and exploration of the meaning of the disease. Hypnosis involved relaxation and suggestions for pain control. Rather than standardized inductions, interventions were tailored to the needs of the patient and were then placed on audiotapes for the patient's benefit. Patients were asked to listen to the hypnosis daily for 20 days following chemotherapy and irradiation. The control conditions were therapist contact and standard care (although through randomization, the standard care group had a preponderance of men, making the investigators choose to eliminate this condition from most analyses because of the potential biasing impact this might have). Patients in the hypnosis group reported significantly less pain following chemotherapy and irradiation than patients in the attention control or cognitive–behavioral therapy groups. However, no significant differences emerged between the conditions in nausea, presence of emesis, or medication use.

Burn care pain. Burn-related pain is similar in many ways to that associated with invasive medical procedures. Typical care of burn wounds often involves daily dressing changes and wound debridements, that is, procedures that clearly produce significant nociception. As mentioned earlier, there are numerous case reports of the utility of hypnosis for burn pain (Patterson et al., 1987), starting with Crasilneck et al.'s (1955) report in the *Journal of the American Medical Association*. Of additional note are Ewin's (1983, 1984, 1986) reports that the early application of hypnosis in the emergency room can not only prevent the development of burn-related pain but can also facilitate wound healing. However, these findings must be considered preliminary as they were case reports and did not include control conditions. We were able to identify six controlled trials of hypnosis for burn wound care pain in the literature.

Wakeman and Kaplan (1978) reported that patients with burns who received hypnosis used significantly less analgesic drugs over a 24-hr period than did a group of patients randomly assigned to receive attention only from a psychologist. Treatment included a variety of therapist and audio-induced hypnotic techniques and suggestions were given for hypnoanalgesia, hypnoanesthesia or

dissociation, and reduction of anxiety and fear. The control group received verbally supportive time from the therapist without interventions for pain control. In this study, the therapist was present during the wound care procedures.

In a series of studies, using the rapid induction analgesia technique reported in detail by J. Barber (1977), Patterson and colleagues have reported that hypnosis reduces patient reports of severe pain. In the first study, Patterson, Questad, and DeLateur (1989) found that patients who received hypnotic analgesia prior to their wound care (the therapist was not present during wound care) who also reported high initial levels of burn pain at baseline showed a significant drop in pain ratings relative to a control group. This initial study did not involve random assignment to treatment condition, but in a subsequent study by Patterson, Everett, Burns, and Marvin (1992), patients randomized to a hypnosis group reported a greater drop in pain scores than did a control group of patients who only received attention from the psychologist. It is interesting to note that Patterson et al. (1992) found this significant effect even though the control intervention was labeled and presented as hypnosis. However, Everett, Patterson, Burns, Montgomery, and Heimbach (1993) did not find that posthypnotic suggestions for comfort, relaxation, and analgesia resulted in reduced pain ratings when compared with an attention control group or to the tranquilizer lorazepam in a subsequent study. One possible explanation for the inconsistent findings is that the initial pain ratings may not have been high enough in the sample of burn patients examined in the Everett et al. study. This explanation has been supported in a subsequent replication, in which Patterson and Ptacek (1997) found that posthypnotic suggestions had a large effect, but only for patients with high levels of initial pain. We should note that Wright and Drummond (2000) showed positive effects of the rapid induction analgesia technique (J. Barber, 1977) and posthypnotic suggestions for analgesia during burn wound care, even when initial levels of pain were not considered. These findings with burn wound care pain led the authors to suspect that motivation (to avoid high levels of pain), increased compliance (from a natural dependence of patients on trauma health care personnel through the course of intensive and acute hospital care), and dissociation (from the acute stress associated with the burn injury) all might play a role in the apparent impact of hypnosis among patients with burns (Patterson, Adcock, & Bombardier, 1997). Unfortunately, none of the six studies on burn wound care included measures of suggestibility and therefore do not allow for examination of the association between this variable and outcome, a particular weakness in this series of investigations.

Labor pain.   Labor pain represents another type of acute pain that is a candidate for hypnotic intervention. Moya and James (1960) and Flowers, Littlejohn, and Wells (1960) reported earlier studies on the clinical benefits of hypnosis for pregnancy. Davidson (1962) also published an earlier successful trial of hypnosis for labor, although this study did not feature a randomized assignment to study groups. Mothers in this study that received six sessions of posthypnotic suggestions for relaxation and pain relief during labor prior to giving birth showed shorter Stage 1 labor, reported that analgesia was more effective, reported less labor pain, and indicated that labor was a more pleasant experience.

R. M. Freeman, Macaulay, Eve, Chamberlain, and Bhat (1986) compared 29 women who received hypnosis before labor with 36 women who received standard care (both groups participated in weekly prenatal classes). Hypnosis involved suggestions for relaxation, pain relief and for transferring anesthesia in the hand to the abdomen. The Stanford Hypnotic Clinical Scale for Adults (Morgan & Hilgard, 1978–1979a) was administered to patients in the hypnosis group. No differences were found in analgesia intake, pain relief during labor, or mode of delivery, and the hypnosis group actually had longer duration of labor (by 2.7 hr, on average). Patients with good to moderate hypnotic suggestibility reported that hypnosis reduced their anxiety and helped them cope with the labor, though specific statistical analyses comparing high and low suggestible patients were not reported.

Harmon et al. (1990) divided 60 pregnant women into two groups on the basis of high and low hypnotic suggestibility scores, who then received six sessions of childbirth education and skill mastery. Half of the women were randomly assigned to receive a hypnotic induction and suggestions as part of this session; the other half received breathing and relaxation exercises. The hypnosis treatment involved a number of suggestions for relaxation and analgesia, is carefully described in the article, and was audiotaped for the patients to listen to daily prior to delivery. Control subjects listened to a commercial prebirth relaxation tape that had several suggestions that may have been similar to hypnosis. The benefits of hypnosis, relative to childbirth education alone, were demonstrated across several variables. The women that received hypnosis had shorter Stage 1 labor, used less pain medication, gave birth to children with higher Apgar scores, and had a higher rate of spontaneous deliveries than did women in the control group. Women receiving hypnosis also reported lower labor pain across a number of scales of the McGill Pain Questionnaire (Melzack & Perry, 1975). In examining the data, it appears that all women in the hypnosis group benefited to some degree but that the women with high hypnotic suggestibility scores showed more benefit in both treatment conditions across all of the outcome domains than did women with low hypnotic suggestibility scores. The women with high suggestibility scores who received hypnosis also showed lower depression scores after birth than did the women with low suggestibility scores in the hypnosis group or women in the control group. An interesting feature of this study is that the participating women were subjected to an ischemic pain task during the training sessions leading up to childbirth. High suggestible women reported lower ischemic pain than did those with low suggestibility scores, and women in the hypnosis group reported lower pain than those in the control group.

Bone marrow aspiration pain.   Another type of acute pain that has shown good response to hypnosis in controlled studies is pain associated with bone marrow aspirations. At least five studies have shown positive findings with such procedures (Katz, Kellerman, & Ellenberg, 1987; Kuttner, 1988; Liossi & Hatira, 1999; Syrjala et al., 1992; Zeltzer & LeBaron, 1982). Zeltzer and LeBaron (1982) randomly assigned 33 children (ages 6–17 years) undergoing either lumbar punctures or bone marrow aspirations to either hypnosis or control (deep breathing, distraction, and practice sessions) groups. Hypnosis, as described by the investigators, involved helping children become increasingly involved in interesting and pleasant images. Interventions were unique to each child and involved story telling, fantasy, imagery, and deep breathing. Both groups demonstrated a reduction in pain, but lower ratings of pain were reported in the hypnosis group, and hypnosis subjects

reported a reduction of anxiety that was not seen in control subjects.

Katz et al. (1987) randomly assigned 36 children (ages 6–11 years) undergoing lymphoblastic leukemia related bone marrow aspirations to hypnosis or play comparison groups. Children in the hypnosis condition received relaxation—imagery and suggestions for pain control and distraction—and posthypnotic suggestions for reentering hypnosis following a cue from the therapist. Although the therapist was present during the procedure, interactions during the procedure were limited to the provision of the cue (hand on shoulder) and brief encouraging statements. The control condition involved nondirected play for an equivalent amount of time spent in the hypnosis condition. Children in both the hypnosis and play groups showed decreases in self-reports of pain and fear relative to baseline. Hypnosis was not found to be superior to the play group comparison intervention.

Kuttner (1988) randomly assigned children (ages 3–6 years) with leukemia to three groups: a control group (standard medical intervention including information, reassurance and support; $n = 8$), a distraction treatment (pop up books, bubbles; $n = 8$), and a hypnotic intervention in which the child's favorite story became the vehicle to create pleasant imaginative involvement ($n = 9$). The therapist was present to provide both the distraction and experimental (hypnosis) interventions during the procedure. On a behavioral checklist completed by external observers, the hypnotic intervention had an immediate impact on observed distress, pain and anxiety; however, this effect was not found in the patient self-report measures.

Liossi and Hatira (1999) compared hypnosis, cognitive–behavioral coping skills training, and standard treatment (lidocaine injection alone) in 30 children (ages 5–15 years) undergoing bone marrow aspirations. Children in both the hypnosis and cognitive–behavioral interventions reported less pain and pain-related anxiety than did controls, relative to their own baseline. Children in the cognitive–behavioral group showed more behavioral distress and reported more anxiety than the hypnosis group, but the authors concluded that both treatments are effective in preparing pediatric patients for bone marrow aspirations. Suggestibility scores were obtained with the Stanford Hypnotic Clinical Scale for Children (Morgan & Hilgard, 1978–1979b). Hypnotic suggestibility showed a strong association with outcome among the hypnosis group (rs = .69, .63, and .60 for pain, anxiety, and observed distress, respectively) but were less consistent in the cognitive–behavioral therapy group (rs = .54, .13, and .36) and the control group (rs = .30, .00, and .06).

Summary of acute pain studies. In summary, there is a substantial amount of anecdotal evidence and there are several well-designed controlled studies to support the efficacy and use of hypnosis with acute pain problems. Most studies in this area have focused on pain produced by invasive medical procedures (e.g., surgery, burn wound care pain, bone marrow aspirations) or childbirth. Across these domains, out of 17 studies that included self-report measures of pain, 8 studies showed hypnosis to be more effective than no treatment, standard care, or an attention control condition. Three studies showed hypnosis to be no better than such control conditions (in one of these, significant effects for hypnosis were found among subjects scoring high in suggestibility), and one study showed mixed results (this study showed significant effects for one pain measure but not another). Out of eight comparisons

with other viable treatments (e.g., cognitive–behavioral therapy, relaxation training, distraction, emotional support), hypnosis was shown to be superior four times. In no case was any condition superior to hypnosis for reducing patient-rated pain severity. In short, treatments described as hypnosis by investigators, and often those involving suggestions for focused attention and for pain relief, are at least as, and about half the time even more, effective than other treatments for reducing the pain associated with invasive medical procedures in both children and adults.

There are a number of important variables that could potentially play a role in the beneficial effects of hypnosis found in these studies. Acute procedural pain is time limited and generally predictable in onset and duration. Both the transient and predictable nature of acute procedural pain makes it possible for hypnotic interventions and skills to be taught to patients in a preparatory manner. In several studies the beneficial effects of hypnosis were obtained even when the therapist was not present during the medical procedure. It is also possible that the severity of acute pain in many of these procedures may contribute to the motivation of patients to participate in treatment, which may, in turn, actually increase the effectiveness of hypnotic analgesia (Patterson & Ptacek, 1997). What is yet to be determined is whether such benefits as reductions in pain and anxiety and improved medical status are worth the cost of clinician time needed to train patients in the use of hypnosis (i.e., whether other studies will demonstrate the cost-effectiveness seen in Lang et al., 2000).

Chronic Pain

Whereas acute pain is that associated with a specific injury and is expected to be short lived, resolving once the injury heals, chronic pain may be defined as pain that persists beyond the healing time needed to recover from an injury (often operationalized as pain that has lasted for more than 3 months) or as pain associated with an ongoing chronic disease or degenerative process (Chapman, Nakamura, & Flores, 1999). The location, pattern, and description of acute pain usually provides information about an underlying acute disease process, and the description of the pain often matches well with what is known about the cause of the pain (Gatchel & Epker, 1999). Chronic pain, on the other hand, usually communicates little about an underlying disease process. Moreover, psychosocial factors, such as patient cognitions, patient pain-coping responses, and social and environmental factors come to play an increasingly important role in the experience and expression of chronic pain over time (Fordyce, 1976; Turk & Flor, 1999). Treatments known to have strong effects on acute pain, such as rest and immobility or opioid analgesics, may have limited usefulness for persons with chronic pain conditions (Fordyce, 1976).

These important differences between acute and chronic pain may have significant implications concerning the manner in which effective hypnotic analgesia is provided, as well as the duration of effect of hypnotic treatments. For example, the likelihood that cognitive factors such as beliefs and cognitive coping responses play a larger role in the experience of chronic pain than the experience of acute pain could make the effects of a psychological intervention such as hypnosis more pronounced. On the other hand, the fact that chronic pain tends to be generally less severe than procedural pain suggests the possibility that persons with chronic pain may feel less urgency or motivation to put effort into

Table 3
Controlled Studies of Chronic Pain Hypnotic Treatment

Study and type of chronic pain problem	Hypnotizability assessed?	N	Randomized?	Control conditions	Adult or child?	Follow-up	Outcome dimensions	Findings
Spiegel & Bloom (1983) Cancer-related pain	No	54	Yes	Standard care (SC), support group without hypnosis (SG)	Adult	None	Patient-rated pain intensity	H > SG > SC
Haanen et al. (1991) Fibromyalgia pain	No	40	Yes	Physical therapy (PT)	Adult	3 months	Morning stiffness	H = PT
							Muscle pain	H > PT
							Fatigue	H > PT
							Sleep disturbance	H > PT
							Self-reported global assessment of outcome	H > PT
							Physician reported global assessment of outcome	H = PT
							FM point tenderness	H = PT
							Symptoms (HSCL–90)	H > PT
Anderson et al. (1975) Headache	No	47	Yes	Medication (M; prochlorperazine)	Adult	None	Number of headaches	H > M
							Number of Grade 4 headaches	H > M
							Frequency of being headache free	H > M
Andreychuk & Skriver (1975) Headache	Yes; Hypnotic Induction Profile	33	Yes	Hand temp biofeedback (HTB), alpha enhancement biofeedback (AEB)	Adult	None	Headache Index (Daily Headache Duration × Headache Severity)	H = HTB = AEB
Schlutter et al. (1980) Headache	No	48	Yes	Biofeedback (BF), biofeedback + relaxation (BFR)	Adult	10–14 weeks	Number of headache hours per week	H = BF = BFR
							Pain intensity	H = BF = BFR
							Pain intensity during submaximum effort tourniquet technique	H = BF = BFR
Friedman & Taub (1984) Headache	Yes; Stanford Hypnotic Susceptibility Scale, Form A	66	No	H (without thermal suggestion), hypnosis with thermal suggestion (HT), BF, relaxation (R), wait list (WL)	Adult	1 year	Highest headache intensity	(H = HT = BF = R) > WL
							Number of headaches	(H = HT = BF = R) > WL
							Medication use	(H = HT = BF = R) > WL
Melis et al. (1991) Headache	Yes, but used for descriptive purposes only; Stanford Hypnotic Clinical Scale for Adults	26	Yes	WL	Adult	4 weeks	Number of headache days per week	H > WL
							Number of headache hours per week	H > WL
							Headache intensity	H > WL
Spinhoven et al. (1992) Headache	Yes, but used for description purposes only; Stanford Hypnotic Clinical Scale for Adults	56	Yes	Autogenic training (AT), baseline control (BC)	Adult	6 months	Headache intensity	(H = AT) > BC
							Psychological distress; CSQ	(H = AT) > BC
							Headache relief	(H = AT) > BC
Zitman et al. (1992) Headache	No	79	Yes	AT, hypnosis not presented as hypnosis (HN)	Adult	6 months	Headache intensity	H > AT; H = HN; HN = AT
							Headache relief	H = HN = AT
							Medication use	H = HN = AT
							Anxiety; STAI	H = HN = AT
							Depression; SDS	H = HN = AT

Table 3 (*continued*)

Study and type of chronic pain problem	Hypnotizability assessed?	N	Randomized?	Control conditions	Adult or child?	Follow-up	Outcome dimensions	Findings
ter Kuile et al. (1994) Headache	Yes; Stanford Hypnotic Clinical Scale for Adults	146	Yes	WL, AT	Adult	6 months	Headache Index (intensity and duration); Medication use; Psychological distress; SCL–90	(H = AT) > WL; H = AT = WL; H = AT = WL
Melzack & Perry (1975) Various chronic pain problems including back, nerve injury, cancer-related, and arthritis pain	No	24	Yes	Alpha feedback alone (A), H, Hypnosis + alpha feedback (HA)	Adult	4–6 months	Sensory pain; MPQ; Affective pain; MPQ; Pain severity; MPQ	HA > (H = A); HA > (H = A); HA > (H = A)
Edelson & Fitzpatrick (1989)	No	27	No	Cognitive–behavioral therapy (CBT), attention control (AC)	Adult	1 month	Walking; Sitting; Reclining; Pain intensity; MPQ; Pain severity; MPQ	CBT > (H = AC); CBT > (H = AC); H = CBT = AC; H = CBT = AC; H > AC; H = CBT; CBT = AC

Note. H = hypnosis alone; FM = fibromyalgia; HSCL–90 = Hopkins Symptom Checklist—90; CSQ = Coping Strategy Questionnaire; STAI = State–Trait Anxiety Inventory; SDS = Self-Rating Depression Scale; SCL–90 = Symptom Checklist—90; MPQ = McGill Pain Questionnaire.

making hypnotic treatment effective. Another potential challenge to the success of hypnosis is the fact that the pain is chronic. To the extent that effective blocking or ignoring of pain facilitated by hypnosis requires psychological resources of the patient, maintaining a reduced pain awareness may prove to be challenging over the long term.

In earlier reviews, efficacy of hypnosis with chronic pain did not fare well. Turner and Chapman (1982) identified many case studies reporting success for hypnosis in alleviating a wide variety of chronic pain syndromes. Yet, at that time, they were unable to identify a single controlled trial that compared hypnosis with a credible placebo condition. They concluded:

> Remarkably, even though hypnosis has been used for longer than any other psychological method of analgesia, the clinical research in this area is sparse, appallingly poor, and has failed to convincingly demonstrate that hypnosis has more than a placebo effect in relieving chronic pain. (Turner & Chapman, 1982, p. 30)

Six years later, Malone and Strube (1988) performed a meta-analysis of nonmedical treatments for chronic pain. Out of 109 published studies, they identified 48 that provided sufficient information to calculate effect size. Fourteen of these studies included hypnosis, with the types of pain problems treated described as mixed group, nonspecific, cancer, headache, back/neck, and lupus. However, only one of these studies of hypnosis provided enough detailed outcome data for Malone and Strube to calculate an effect size and an average percentage of improvement. The mean rate of improvement in this one study was only 13%, which did not compare favorably with that of autogenic training (68%) or of biofeedback-assisted relaxation training (84%). In fact, none of these compared that well with the average 77% improvement rate they found for no-treatment conditions.

Although hypnosis did not fare well in earlier reviews with chronic pain, there were very few randomized controlled studies available at the time these reviews were written from which to base conclusions about the effects of hypnosis on chronic pain. However, a number of controlled trials of hypnosis for chronic pain have been published since these reviews were written. As we describe below, these studies show hypnosis as a potentially helpful treatment for reducing the pain associated with chronic pain conditions.

Headache pain. Far more studies have focused on the use of hypnosis for headache than for any other etiology of chronic pain. We identified nine such studies that are listed in Table 3 along with other chronic pain etiologies; the nature of the hypnotic interventions used in these studies are described in Table 4. Andreychuk and Skriver (1975) randomly assigned 33 patients with migraine headaches to groups in which they received biofeedback training for hand warming, alpha enhancement biofeedback, or self-training in hypnosis. Hypnosis treatment lasted 10 weeks and was provided during the weekly sessions through audiotapes that included suggestions for relaxation, visual imagery techniques, verbal reinforcers, and suggestions for pain reduction. Patients were also asked to listen to the tapes outside of the sessions twice every day. Patients in the biofeedback conditions also listened to a tape that included suggestions for relaxation and were asked to listen to this tape twice daily throughout treatment. Outcome was measured with the Headache Index (the product of Daily Headache Dura-

Table 4
Description of Hypnotic Treatment: Chronic Pain Studies

Study	Length of treatment (no. and length of sessions)	Audiotaped?	Description of intervention
D. Spiegel & Bloom (1983)	1 year (5–10 min of hypnosis after weekly 90-min group therapy sessions)	No	Suggestions to "filter the hurt out of the pain" (p. 338) by imagining competing sensations in affected areas.
Haanen et al. (1991)	3 months (eight 1-hr sessions)	Yes	Suggestions for arm levitation, deepening, ego strengthening, control of muscle pain, relaxation, and improvement of sleep disturbance. Third session was taped, and subjects were asked to listen to tape daily.
Anderson et al. (1975)	1 year (six or more sessions)	No	Unstandardized trance induction followed by suggestions for ego strengthening, relaxation, and decreased tension and anxiety. Patients asked to give themselves similar suggestions with autohypnosis daily.
Andreychuk & Skriver (1975)	10 weeks (ten 45-min sessions)	Yes	Listening to a tape (two listenings per session) that included suggestions for relaxation and visual imagery and "direct suggestions for dealing with pain" (p. 177), which included relaxation instructions and verbal reinforcers. Subjects were encouraged to practice twice daily between sessions.
Schlutter et al. (1980)	4 weeks (four 1-hr sessions)	No	Eye fixation followed by suggestions for relaxation, analgesia or numbness, and visualization of an enjoyable situation.
Friedman & Taub (1984)	3 weeks (three 1-hr sessions)	No	Induction only or induction plus thermal imagery, which included suggestions for imagery involving placing hands in warm water and experiencing hand warmth. Subjects were asked to practice self-hypnosis daily for 3–5 min.
Melis et al. (1991)	4 weeks (four 1-hr sessions)	Yes	Eye fixation followed by suggestions for relaxation and the flow off technique (expressing headache as visual image and changing). Each session was taped, and patients were asked to listen to the tape daily between sessions.
Spinhoven et al. (1992)	8 weeks (four 45-min sessions) and three booster sessions at 2, 4, and 6 months after treatment	Yes	Suggestions for relaxation, imaginative inattention, pain displacement, transformation, and imagining self in the future without pain. In Session 4, a tape was made for self-practice, and subjects were instructed to listen to tape twice daily.
Zitman et al. (1992)	8 weeks (four 45-min sessions) and three booster sessions at 2, 4, and 6 months after treatment	Yes	Suggestions for relaxation and for imagining self in a future situation in which pain control has been achieved. Subjects were asked to practice with tape twice daily.
ter Kuile et al. (1994)	7 weeks (seven 1-hr sessions) and then three 1-hr booster sessions at 2, 4, and 6 months after treatment	Yes	Suggestions for relaxation, imaginative, pain displacement, transformation, hypnotic analgesia, and altering maladaptive cognitive responses. The suggestions of the last session were taped, and subjects were asked to listen to tapes twice daily for 15 min.
Melzack & Perry (1975)	6–12 sessions (2 hr for hypnosis + alpha feedback group, 1–1.5 hr for alpha feedback alone and hypnosis alone groups)	Yes	Taped 20-min suggestions for relaxation, feeling stronger and healthier, having greater alertness and energy, less fatigue, less discouragement, feeling greater tranquility and ability to overcome things that are ordinarily upsetting, being able to think more clearly, to concentrate and remember things, be more calm, less tense, more independent, and less fearful.
Edelson & Fitzpatrick (1989)	2 weeks (four 1-hr sessions)	No	Hypnosis condition was identical to cognitive–behavioral control condition, except that the hypnotic condition was preceded by a "hypnotic induction"; any specific suggestions made were not described.

Note. None of the studies were manualized.

tion × Headache Severity), and suggestibility was measured with the Hypnotic Induction Profile (H. Spiegel & Bridger, 1970). Reduction in headaches was seen in all three groups, with no significant differences. However, patients with high hypnotizability scores showed larger treatment effects than patients with low hypnotizability scores, independent of treatment.

Anderson, Basker, and Dalton (1975) randomly assigned 47 patients with migraines to hypnosis or medication (prochlorpera-

zine) groups. Hypnosis patients received six or more sessions over the course of 1 year and were asked to practice autohypnosis daily (without the assistance of an audiotape) and to give self-suggestions for relaxation, ego strengthening, decreased tension, and aversion of migraine attacks. Patients receiving hypnotherapy showed fewer headaches per month, fewer Grade 4 headaches, and a higher frequency of remission than those who received prochlorperazine.

Schlutter, Golden, and Blume (1980) randomly assigned 48 patients to groups that received hypnosis, electromyograph (EMG) biofeedback alone, or EMG feedback plus progressive relaxation. Patients in the hypnosis condition received four 1-hr sessions over the course of 4 weeks, and hypnosis consisted of eye fixation followed by suggestions for relaxation, analgesia or numbness, and visualization of an enjoyable experience (Greene & Reyher, 1972). Patients in each of the treatment conditions reported similar reductions in number of headache hours per week and average headache pain.

Friedman and Taub (1984) also failed to find differences among treatments including a hypnotic induction-only condition, an induction plus thermal imagery condition, a thermal biofeedback condition (which included the provision of standard autogenic phrases eliciting feelings of warmth), and a relaxation condition in 66 patients with migraines. All treatment groups showed improvements as measured by headache ratings and medication use, relative to wait list controls. It is important to note that subjects with high scores on the Stanford Hypnotic Susceptibility Scale, Form A (Weitzenhoffer & Hilgard, 1959) showed meaningful decrements on outcome variables at the 1-year follow-up, across treatment conditions, when compared with those who scored low on this measure.

Several additional controlled studies on hypnosis with headaches have been published over the past decade with similar results. Melis, Rooimans, Spierings, and Hoogduin (1991) had 26 patients with chronic headaches undergo 4 weeks of baseline observation, and then randomly assigned them either to four weekly 1-hr sessions of hypnosis supplemented by home practice audiotape or to 4 weeks of no treatment (wait list). The hypnosis intervention was described as including the "flow off" technique (expressing and changing the headache as a visual image) as well as suggestions for moving the pain to other areas of the body. The hypnosis group reported significantly more improvement on number of headaches, headache hours, and headache days than the wait list control group did. Although the investigators used the Stanford Hypnotic Clinical Scale for Adults to describe their sample, they did not report on any association between suggestibility and outcome.

Spinhoven and his colleagues have published a number of randomized studies that indicate that hypnosis is essentially equivalent to autogenic training (in Spinhoven, Linssen, Van Dyck, & Zitman, 1992, autogenic training consisted of suggestions for hand heaviness, hand warming, and coolness of the forehead) in controlling tension headaches. Using 56 patients in a within-subjects, randomized design, they found that both hypnosis and autogenic training improved average headache pain intensity, psychological distress, and headache relief relative to a wait list control group. Hypnosis consisted of four sessions (over the course of 8 weeks) of suggestions for relaxation, imaginative inattention, and pain displacement and transformation. Similarly, ter Kuile et al. (1994) reported that in 146 subjects, hypnosis and autogenic training showed effects on headache duration and intensity over a wait list control but were no different from one another. Subjects who scored high on the Stanford Hypnotic Clinical Scale for Adults showed greater treatment effects posttreatment and at follow-up than did those who scored low, independent of treatment condition. The hypnosis treatment was similar to that used in the Spinhoven et al. study, but it included cognitive–behavioral interventions on maladaptive cognitive responses.

Zitman, Van Dyck, Spinhoven, and Linssen (1992) took 79 patients with headaches and first randomly assigned them to autogenic training or to "future-oriented" hypnosis (FI) that was not labeled as hypnosis. FI treatment largely involved having patients imagine themselves in a future situation in which pain reduction had been achieved. In the second phase, 6 months later, all patients who received either autogenic training or FI in the first phase were offered FI again, except that in this phase FI was "openly presented as a hypnotic technique" (p. 221). All three treatments appeared to be equally effective in reducing Headache Index scores. However, at 6-month follow-up, the FI group practicing what was explicitly labeled as hypnosis showed the greatest improvement on the Headache Index—and this improvement was statistically significantly greater than that reported by the attention control condition. There are at least two plausible explanations for the greater impact of the second hypnosis intervention. First, this higher efficacy may have been due to the fact that at the follow-up to the second phase, these subjects had received twice as much treatment (14 sessions total) as they had at the end of the first phase. Second, it is also possible that explicitly labeling the procedures as hypnosis might have been responsible for the treatment advantage.

The findings for the headache studies in aggregate are consistent with the conclusion of a review performed by Spinhoven (1988), that the effects of hypnotic treatments for headaches do not differ significantly from those of autogenic or relaxation training. K. A. Holroyd and Penzien (1990) reached the same conclusion in a more recent review. The only exception to this is Zitman et al.'s (1992) finding with FI, but this finding might reflect a dose effect (because subjects in this condition received more hypnosis than the subjects in the autogenic treatment condition) or an increased expectancy effect caused by an explicit labeling of the intervention as hypnosis.

It is notable that in those studies that included measures of suggestibility, patients showed more improvement with headache control if they scored high on tests of hypnotic suggestibility, independent of whether they received hypnosis, autogenic training, or relaxation. Along these lines, the many similarities between hypnotic treatment and relaxation interventions, such as autogenic training, are worth noting. In fact, Edmonston (1991) has argued that hypnosis cannot be differentiated from, and in fact may be, a form of deep relaxation. On the other hand, relaxation and autogenic training both often include hypnotic-like suggestions for comfort, focused attention, and changes in perceptions, so perhaps these should be considered variants of hypnotic treatment. To complicate matters further, Spanos and Chaves (1989a, 1989b, 1989c) have long argued that positive responses to suggestions for pain control can be achieved without the induction of a hypnotic state. Studies on the hypnotic control of headache pain therefore raise two important questions: (a) What role does relaxation play in the effects of hypnotic analgesia (particularly given the role of tension in causing many forms of headaches)? and (b) What role do suggestions (i.e., hypnosis) play in the effects of relaxation training?

Chronic pain other than headache. Controlled trials of hypnosis for chronic pain conditions other than headache are few, but do provide some preliminary evidence that hypnosis is effective for reducing pain for a number of chronic pain conditions (see

Tables 3 and 4). We were able to identify four such studies. D. Spiegel and Bloom (1983) examined pain control and other variables in women with chronic cancer pain from breast carcinoma (as opposed to pain from cancer-related medical procedures discussed in the *Acute Pain* section). Fifty-four women were assigned to either a usual treatment control condition ($n = 24$) or to a group receiving usual treatment and weekly group therapy for up to 12 months ($n = 30$). The women in group therapy were, in turn, assigned to groups that either did or did not have brief (5–10 min) self-hypnosis as a part of their group therapy treatment (the nature of treatment was based on H. Spiegel & Spiegel, 1978). Both support groups showed improvement in pain control over usual treatment. However, women who received self-hypnosis showed an improvement above and beyond that of other interventions on reduced pain intensity.

One controlled study examined the effects of hypnosis among persons with refractory fibromyalgia (Haanen et al., 1991). Haanen and colleagues randomly assigned patients with this diagnosis to groups that received either eight 1-hr sessions of hypnotherapy (supplemented by a self-hypnosis home practice audiotape) over a 3-month period or 12 to 24 hr of physical therapy (massage and muscle relaxation training) for 12 weeks, with follow-up at 24 weeks. The investigators found larger improvements in the patients who received hypnosis than in the patients who received physical therapy on measures of muscle pain, fatigue, sleep disturbance, and overall assessment of outcome and distress scores. These differences were maintained through the follow-up assessment. Although this study is limited in that the control condition and the hypnosis condition were not equivalent in terms of patient contact and time, the findings are important because they provide one of the few tests of hypnosis in a chronic pain sample other than persons with headaches that used a randomized design.

Two controlled studies have been reported on hypnosis with chronic pain of mixed etiology. Melzack and Perry (1975) examined the effects of hypnosis and alpha biofeedback in 24 patients with a variety of chronic pain problems, including back pain ($n = 10$), peripheral nerve injury ($n = 4$), cancer ($n = 3$), arthritis ($n = 2$), amputation ($n = 2$), trauma ($n = 2$), and "head pain" ($n = 1$). Patients were randomly assigned to one of three groups; 12 received 6 to 12 sessions of hypnosis plus alpha training, 6 received hypnosis alone, and 6 received alpha training alone. Pain was assessed just before and just after each treatment session. The authors reported that alpha training had the smallest effect on pain, followed by hypnosis, which had a greater, but not statistically significant, effect on pain reduction. The combination of alpha training and hypnosis, however, had an impressive impact on pain reduction, as measured by scales from the McGill Pain Questionnaire (Melzack & Perry, 1975). Fifty-eight percent of the patients reported a reduction of pain of 33% or greater. The authors acknowledged that their study design could not rule out placebo effects as a possible explanation for the reductions in pain observed because there was not a placebo condition or even a no-treatment condition. Certainly, however, the findings indicate that the further study of the potential additive effects of hypnosis with other treatments for chronic pain is warranted.

Edelson and Fitzpatrick (1989) also looked at patients ($N = 27$) with mixed etiologies for pain, with back pain being the most frequent. Patients were randomly assigned to four 1-hr sessions of an attention control (supportive, nondirective discussions), a cognitive–behavioral, or a hypnosis group. The hypnosis group received the same information as the cognitive–behavioral group but after a standard hypnotic induction. The cognitive–behavioral group showed increases in walking and decreases in sitting relative to the control group and the hypnosis group, while the hypnosis group showed improvements in subjective ratings of pain only (McGill Pain Questionnaire total score) relative to the attention control condition.

Five additional investigations deserve mention even though they did not use random assignment to experimental (hypnosis) and control conditions. Using a multiple baseline design, Simon and Lewis (2000) reported that 28 patients with temporal mandibular disorder pain showed improved pain control at 6-month follow-up after receiving six sessions of hypnotic analgesia. This pain had previously been refractory to other treatments. Crasilneck (1995) used hypnosis with 12 patients who had what he described as intractable organic pain. His intervention involved multiple inductions within the same sessions followed by six specific suggestions for pain management, including pain displacement, age regression to a time period prior to the onset of pain, and a reexperiencing of the experience of being pain free, and glove anesthesia. He reported 80%–90% relief of pain at 1-year follow-up. M. Jensen, Barber, Williams-Avery, Flores, and Brown (2001) examined the effects of hypnosis with analgesia suggestions among 22 patients with spinal cord injury-related pain. They found that 86% of their sample reported a decrease in pain following a hypnotic induction and analgesia suggestions relative to prehypnosis pain levels. Dinges et al. (1997) used self-hypnosis as part of a cognitive–behavioral treatment program in an attempt to manage pain from sickle cell disease. Thirty-seven children, adolescents, and adults provided 4 months of baseline data before undergoing the combination of behavioral and self-hypnotic treatment. Findings indicated a substantial decrease in pain-related episodes following treatment. Finally, James, Large, and Beale (1989) evaluated self-hypnosis using a multiple baseline design for 5 patients with chronic pain and who were selected for high scores on hypnotic susceptibility tests. They found variable outcomes, with 2 of the patients reporting significant improvement, 2 reporting little change (although these 2 did find that self-hypnosis was effective on some occasions), and 1 reporting no apparent benefit.

Summary of chronic pain studies. The findings of chronic pain studies parallel, in some ways, those from acute etiologies. Compared with no-treatment, standard care, or attention conditions, hypnotic analgesia procedures result in significantly greater reductions in a variety of measures of pain. However, when hypnosis is compared with other treatments, in particular with other treatments that share many characteristics with hypnosis (e.g., suggestions for relaxation and competing sensations) such as autogenic and relaxation training, hypnosis is less often found to be superior to these alternative treatments. This finding is somewhat in contrast to the several acute pain studies demonstrating the superiority of hypnosis to other treatments. However, in none of these studies has hypnosis been shown to be less effective than any other treatment for reducing pain. Moreover, it is possible that hypnosis may be less time consuming and more efficient than either autogenic or relaxation training. At the very least, the question of relative efficiency of hypnosis, autogenic training, and relaxation training should be investigated in future studies.

Methodological Issues of Hypnotic Analgesia Research

Although the results of this review indicate that hypnotic analgesia results in decreased pain from a variety of acute and chronic pain conditions, several important methodological issues make firm conclusions regarding the efficacy of hypnotic analgesia difficult to make. For example, the numbers of patients in published controlled trials tend to be low, which limits the power to detect statistical differences between treatment conditions. Hypnotic interventions also vary widely from study to study. Moreover, although several studies referred to citations or scripts to describe their experimental intervention, only Lang et al. (2000) described a carefully detailed manualized procedure. There is clearly a need for more randomized clinical trials that include larger samples and standardized hypnotic procedures, particularly in the area of chronic pain (other than that caused by headaches). Three additional key methodological issues that deserve detailed discussion include suggestibility, nonspecific versus specific effects, and practice–dose effects.

Hypnotic Suggestibility

As discussed above, one of the most robust findings in the laboratory pain hypnosis literature has been the association between hypnotic pain reduction and hypnotic suggestibility as measured by hypnotizability scales (R. Freeman et al., 2000; E. R. Hilgard, 1969; E. R. Hilgard & Hilgard, 1975; E. R. Hilgard & Morgan, 1975; Knox et al., 1974; Miller et al., 1991). Moreover, Montgomery et al. (2000) found suggestibility to be an important variable in their meta-analysis of both experimental and clinical studies.

Patterson et al. (1997) have previously suggested that the relationship between suggestibility and pain control may not necessarily generalize well to clinical situations. For example, Gillett and Coe (1984) reported that they found no differences in response to hypnotic analgesia between low and high suggestibility patients undergoing painful dental procedures. In the current review, of the controlled studies we examined, seven assessed the association between suggestibility and outcome—four acute pain studies (R. M. Freeman et al., 1986; Harmon et al., 1990; Lang et al., 1996; Liossi & Hatira, 1999) and three chronic pain studies (Andreychuk & Skriver, 1975; Friedman & Taub, 1984; ter Kuile et al., 1994). Of these, all but one demonstrated a positive association between suggestibility and at least one outcome measure; Lang et al. (1996) was the only exception. In several studies, patients scoring high on tests of hypnotic suggestibility often showed as much benefit from other psychological treatments (autogenic training, relaxation, cognitive–behavioral) as they did from hypnosis (Andreychuk & Skriver, 1975; Friedman & Taub, 1984; Liossi & Hatira, 1999; ter Kuile et al., 1994). High suggestibility was also associated with long-term treatment effects in the one study that examined this (Friedman & Taub, 1984).

Thus, on the basis of the available studies, there does appear to be some association between clinical effect and suggestibility. Moreover, unlike many of the studies in the hypnotic analgesia literature of experimental pain, subjects in these studies were not specifically selected from the high and low ends of hypnotizability scales. Social–cognitive theorists have maintained that little can be concluded about the importance of suggestibility if medium sus-

ceptible subjects are not included in experimental designs (Kirsch & Lynn, 1995). The fact that the studies in the current review included subjects representing all ranges of suggestibility argues even more strongly for the potential importance of this variable in predicting analgesic treatment outcome in clinical populations.

Of course, the fact that an association exists between hypnotic suggestibility and treatment outcome does not necessarily mean that only persons with high screening scores should be offered hypnotic analgesia. Just because highly suggestible patients benefit more, on average, than those low on this variable does not mean that patients falling in the medium or low range would never benefit. In their discussion of this issue, Montgomery et al. (2000) showed that although highly suggestible people may obtain the most benefit, persons with medium scores can report pain relief from hypnotic analgesia, and even those with low suggestibility scores showed an effect size greater than zero (albeit the effect size for this group was very close to zero). Montgomery et al. concluded that 75% of the population could obtain "substantial" pain relief from hypnotic analgesia; given that the rates of highly suggestible people in the population is roughly 30% (E. R. Hilgard & Hilgard, 1975), this would certainly indicate that analgesic effects extend well beyond those scoring at the high end of the curve on this variable.

In addition, there is some evidence that people can increase their suggestibility with training and practice. For example, J. Holroyd (1996) has suggested that hypnotic analgesia can be improved through manualized training programs for patients. Similarly, Barabasz (1982) has demonstrated that restrictive environmental stimulation (REST) can increase both suggestibility scores and experimental pain tolerance (to shocks). Barabasz and Barabasz (1989) indeed demonstrated this finding among persons with chronic pain; subjects were able to increase their Stanford Hypnotic Susceptibility Scale scores and tolerance to ischemic pain following REST. It would seem that a primary benefit of research on suggestibility and response to analgesia is that it can be useful to identify patients that can respond readily and can also indicate those that might need additional training or support.

Nonspecific Versus Specific Effects

A second important issue concerning studies of clinical hypnotic analgesia is that of nonspecific effects. Frequently referred to in the literature as placebo effects, the term *nonspecific* better captures effects common to all treatments but not specific to the treatment being examined (Kazdin, 1979). Ideally, clinical trials not only determine that a treatment is effective relative to no treatment, or to a no-treatment waiting period, but also to a treatment condition designed to control for nonspecific effects. Designing such control conditions for hypnosis treatment is particularly challenging, however, because there are so many components to hypnotic interventions used in the clinical setting. For example, in many of the studies we reviewed, hypnosis included an induction, deepening, and suggestions for pain relief within the context of the induction. Studies in the laboratory have indicated that not all of these components are necessary for pain reduction and other perceptual phenomena (Chaves, 1993), although these findings have not been replicated in clinical pain populations. An ideal study would independently manipulate each of the components of what has traditionally been included in hypnotic treat-

ments and compare these components to a "placebo" condition that controls for therapist time and patient expectancy but might not otherwise be expected to affect pain. A series of such studies would help determine the extent to which an induction, deepening suggestions, or analgesia suggestions are necessary or sufficient for pain reduction, and also help determine the extent to which hypnotic analgesia results in reductions of pain over and above the effects of expectancy and therapist attention.

Along the same lines, the question of whether an intervention is labeled as hypnosis has been brought to the fore in this review. Although all of the investigators clearly viewed the interventions tested in the studies reviewed as hypnosis, and it is likely that in most cases the interventions were presented as such to the study participants, it was often not specifically made clear that the patients studied were informed that they were undergoing hypnosis; this was particularly the case in studies with children. Moreover, in two of the studies, the investigators viewed their intervention as hypnosis, but specifically did not label it as such (Faymonville et al., 1997; Zitman et al., 1992). This brings up the important definitional issue of whether a patient who unknowingly undergoes an induction has received hypnosis, and whether such labeling influences the outcome of treatment. Ideally, future studies would include conditions in which the patient is told or not told the intervention is hypnosis, in order to disentangle the effects of this variable on treatment efficacy.

Although no clinical study on hypnotic analgesia published to date has systematically manipulated the label of the procedure tested (as *hypnosis* or not), some of the studies reviewed in this article did manipulate other components of the interventions, and so shed some preliminary light on the contributions of each to outcome. For example, several studies indicated that hypnotic pain control was significantly more effective than a condition in which patients received an equivalent amount of attention from the psychologist (Patterson et al., 1992; Patterson & Ptacek, 1997; Syrjala et al., 1992; Wakeman & Kaplan, 1978). In addition, a few studies included a control group in which the attention from the psychologist was labeled as hypnosis (Everett et al., 1993; Patterson & Ptacek, 1997; Patterson et al., 1989; Zitman et al., 1992), and most of these found the hypnotic intervention to be superior to the control intervention that had been labeled as hypnosis for patients. Several studies included control with relaxation and deep breathing (Davidson, 1962; Katz et al., 1987; Zeltzer & LeBaron, 1982) and the majority of studies on headache pain have compared hypnosis with treatment groups that have used autogenic training or progressive relaxation (see Table 3).

Not only is it important to seek to control for and test the relative contributions of the components of hypnosis but that studies determine the relative efficacy of various specific hypnotic suggestions. Tables 2 and 4, for example, list the many different hypnotic inductions and suggestions given in the studies reviewed in this article. Given the research that has demonstrated differential neurophysiological responding to different specific suggestions (e.g., Rainville et al., 1999), much more attention needs to be paid to the specific suggestions that are provided during treatment. It is very likely that some suggestions will be more effective for reducing pain experience than others. At a minimum, authors must provide clear descriptions of the specific suggestions made to the participants in any clinical trial. Ideally, these would be standardized and consistent across the patients within a trial. Better yet, investiga-

tors could systematically manipulate different suggestions within the same trial to determine which provide the greatest relief, decreases in global suffering, and improvements in function.

Practice and Dose Effects

A third issue that becomes apparent when examining the controlled trials of hypnotic analgesia for clinical pain concerns the marked variability in the amount of hypnotic treatment administered. Often, in the chronic pain studies for example, hypnotic treatment was provided in individual weekly sessions that lasted 45 min to 1.5 hr for 4 to 10 sessions over the course of 1 or 2 months. However, some patients received much less treatment at a time (e.g., 5–10 min of group hypnotic treatment at the end of a group therapy session; D. Spiegel & Bloom, 1983) or received treatment spread out over a longer period of time (e.g., sessions provided at intervals of 10–14 days; Anderson et al., 1975).

Only two studies with acute pain provided patients with audiotaped hypnosis instructions or suggestions to supplement those provided by the clinician, although both of these studies showed robust treatment effects (Harmon et al., 1990; Syrjala et al., 1992). However, many of the studies on chronic pain included audiotaped supplements and, although they all showed improvement over no treatment, effects were generally similar to those from autogenic or relaxation training studies (whose subjects also were often provided with audiotapes for practice; see Table 3). Unfortunately, none of the studies we reviewed included the presence or absence of an audiotape as an independent variable. Thus, at this time, we are not able to draw firm conclusions regarding the relative importance of home practice to treatment effects for either acute or chronic pain treatment.

Future research is needed to determine the extent to which there is a dose effect for hypnotic analgesia (e.g., by systematically varying the amount of hypnotic treatment received), as well as determine whether home practice improves the short- or long-term effects of hypnotic analgesia. At a minimum, controlled studies need to take these factors into account when designing experimental treatments and to ensure that they clearly indicate the number and length of hypnotic sessions administered, the extent to which subjects were required to practice outside of the sessions, and of great importance, whether the subjects complied with the practice recommendations.

The Puzzle of Chronic Pain

This review indicates positive analgesic effects for the use of hypnosis with both chronic and acute pain. However, studies with acute pain often demonstrated that hypnosis is superior to other psychological interventions for pain; such has not been the case with chronic pain. In carefully scrutinizing the hypnotic suggestions given for chronic pain in the studies reviewed (see Table 4), we discovered that, as a whole, clinical studies performed with patients with chronic pain often appear to provide hypnotic suggestions that fail to appreciate the multifaceted and complex nature of pain. Our contention is that hypnosis is often applied to chronic pain in a simplistic manner, and that effect sizes and treatment duration could be enhanced if clinicians and researchers used this treatment with a more comprehensive understanding of this problem (or at least reported this if it was indeed their practice). The

following sections provide the rationale for this argument. In the remainder of this review we address some of the factors we believe may account for the inconsistent findings of hypnotic analgesia with chronic pain.

Pain Versus Suffering

A particularly vexing issue in applying hypnosis to chronic pain is that treatment must often address suffering rather than, or at least in addition to, pain (Fordyce, 1988) because chronic pain often persists in the absence of tissue damage (Loeser, 1982). There are at least five mechanisms that can result in suffering or pain behavior in the absence of nociception (tissue damage), and they are frequently present in patients with chronic pain. First, this group often has psychological disorders that, when treated, might alleviate the pain (Chibnall & Duckro, 1994; Geisser, Roth, Bachman, & Eckert, 1996; Romano & Turner, 1985). Second, patients with chronic pain often hold specific beliefs about their pain that are maladaptive, such as the beliefs that the source of their pain requires a biomedical solution, that pain is a signal of harm or physical damage, and that they are necessarily disabled by pain (M. P. Jensen, Turner, Romano, & Lawler, 1994); effective treatment involves modifying such thoughts (Turner & Romano, 2001). Third, somatization and somatosensory amplification are associated with chronic pain and a tendency to experience higher levels of pain (Barsky, Goodson, & Lane, 1988; Wilson et al., 1994). Fourth, operant or learning factors (social reinforcement in the form of unemployment compensation or attention from a solicitous spouse) often maintain pain behaviors in persons with chronic pain, well after a lesion is healed (Fordyce, 1976). Finally, chronic pain is thought to be maintained, at least in part, by deactivation, guarding and changes in body mechanics (Fordyce, 1976), and classic treatment involves systematic increases in strength and mobility, as well as multidisciplinary treatment with goals of returning patients to work, decreasing physician visits, lessening dependence on pain medication, and increasing functional activity (Turk & Okifuji, 1998).

Although appreciating such contributions to chronic pain may be apparent to theorists and practitioners in this area, studies on hypnotic analgesia of chronic pain problems make little or no mention of these factors. When chronic pain or suffering is primarily due to one or more of the factors discussed above, pain reduction may not be the primary goal of treatment. Pain treatment programs often have multiple indicators of treatment outcome, and pain reduction is often regarded to be less important than indicators of more functional activity (Turk & Okifuji, 1998). In fact, when hypnosis is used with some patients with chronic pain to reduce pain, the effect may be counterproductive. If a person with chronic pain is demonstrating illness conviction, he or she might regard hypnotic analgesia as a magical means to eliminate nociceptive input when the focus of treatment should be on any number of those factors discussed above. Yet, in almost every report or study discussed on the use of hypnosis with chronic pain, the primary role of hypnosis has been to decrease pain.

We believe that the impact of hypnosis on chronic pain might be strengthened if suggestions are geared toward reducing suffering or pain behaviors, or increasing activity and "well" behaviors, in addition to, or even in some cases rather than, suggestions for pain reduction. Chaves and Dworkin (1997) have pointed out that

hypnosis has not been applied to chronic pain rehabilitation. In support of this conclusion is the fact that in all of the studies we reviewed there was no mention of providing suggestions for increasing activity for chronic pain or for fitting suggestions into the context of a larger treatment program (see Table 4). Rather, suggestions were almost exclusively geared toward relaxation, comfort, and analgesia. Hypnotic suggestions might be targeted toward increasing activity that is safely within the confines of the patient's limitations. Because patients with chronic pain are often depressed and perhaps grieving loss of activity, relationships, or employment, suggestions can also be targeted toward improvement of affective state (Yapko, 1992). Another potentially useful application of hypnosis might be to help the patients alter their model of the etiology of pain. One of the biggest challenges in treating chronic pain is to motivate patients to engage in treatment, and one novel application would be to combine it with recent models for engaging patients in the treatment process (M. P. Jensen, 1996; Kerns & Rosenberg, 2000).

Increasing Treatment Effect

Montgomery et al. (2000) concluded from their meta-analysis of experimental and clinical studies that most people can benefit from hypnotic analgesia. Perhaps of equal importance with respect to chronic pain are findings from Kirsch, Montgomery and Sapirstein (1995), who performed a meta-analysis of 18 studies in which cognitive–behavioral therapy was compared with the same therapy supplemented by hypnosis. The results of their analysis indicated a substantial effect size with the addition of hypnosis; the authors estimated that more than 70% of the patients benefited from adding hypnotherapy to the treatment. We believe a neglected question is whether hypnosis can increase the treatment effects of multidisciplinary treatment programs. For example, Kirsch et al. reported that when hypnosis is added to an obesity program, weight loss is maintained over longer treatment periods. An effective practitioner working with patients with obesity certainly knows that treatment for this problem is multidimensional, involving increasing activity, stimulus control, and self-monitoring (Levitt, 1993; Wadden & Bell, 1990). An obesity specialist would also see the folly of using hypnosis as an isolated intervention for eliminating appetite. Isolated attempts to reduce pain levels in some patients with chronic pain via hypnosis is analogous to attempting to reduce appetite in patients with obesity. Hypnosis adds to the effects of a comprehensive program for weight loss, and it seems reasonable to hypothesize that it would do the same for chronic pain.

This notion was apparent as early as 1975, when Melzack and Perry (1975) demonstrated the efficacy of hypnosis with chronic pain in a controlled study (though admittedly not one including a placebo condition). To reiterate, the investigators found neither biofeedback nor hypnosis to be effective in themselves; however, the combination of treatments resulted in significantly enhanced clinical effects. More studies with chronic pain should investigate the use of hypnosis for chronic pain in concert with other approaches.

Specifying Suggestions

Studies with pain induced in the laboratory suggest that the nature of the hypnotic suggestion is an influential variable in

outcome. Perhaps the most salient example comes from the studies examining the impact of hypnotic analgesia on sensory versus affective pain. As discussed above, a number of researchers have speculated whether hypnosis has a greater effect on sensory versus affective components of pain (Price & Barber, 1987; Price et al., 1987), and Rainville et al.'s (1999) recent study indicated that the crucial variable was the nature of the hypnotic suggestion. Specifically, suggestions for sensory reductions of pain resulted in decreased activity in the somatosensory cortex, and suggestions for affective pain reduction led to decreased activity in the part of the brain that processes more emotional and suffering information. The one occasion where investigators in the Spinhoven laboratory (Zitman et al., 1992) found an advantage of hypnosis over autogenic training was when future oriented suggestions for pain control were made. Although yet to be tested in a controlled clinical trial, it follows that if a clinician desires that patients have pain control over the long term, then it is important to provide them with that suggestion specifically (J. Barber, 1998). Hypnotic suggestions for analgesia should also be targeted toward both sensory and affective dimensions of pain. Following the logic presented in the immediately preceding sections, if the goal of treatment is to increase activity, return to work or change an individual's model of pain, then it makes sense to tailor at least some of the hypnotic suggestions accordingly.

Analgesic Suggestions for Chronic Pain

In spite of our recommendations for targeting hypnotic suggestions for multiple aspects of chronic pain treatment, we certainly acknowledge that in many cases suggestions for analgesia with such patients would be appropriate. Certainly pain that has ongoing nociceptive input (e.g., cancer, spinal cord injury, arthritis, diabetic neuropathy) and fewer of the nonnociceptive factors maintaining it may be more responsive to hypnotic analgesia. In his prolific writing on clinical applications of hypnosis, Erickson (1980; Erickson & Rossi, 1981; Erickson, Rossi, & Rossi, 1976) reported a number of anecdotally effective suggestions for chronic pain, including (a) those for the direct abolition of pain, (b) amnesia, (c) analgesia, (d) anesthesia, (e) posthypnotic relief, (f) time distortion, (g) reinterpretation of the experience, (h) dissociation, and (i) displacement. It is interesting, then, that Erickson noted that suggestions for the direct abolition of pain or complete anesthesia seldom showed lasting results (Erickson et al., 1976). He often recommended instead that the patient's chronic pain be moved on a continuum to a less unpleasant level. As an example, Erickson (1980) suggested that a patient with a severe malignant pain would experience that sensation as an unpleasant itching mosquito bite.

Although not tested in any empirical studies, several writers have emphasized the need to provide suggestions for pain control to patients with chronic pain on several occasions over the course of time (J. Barber, 1996; Crasilneck, 1995). We earlier described J. Holroyd's (1996) point that hypnosis can be repeatedly practiced even by those low in suggestibility much like a form of meditation (see also Alden & Heap, 1998), and Barabasz's (1982; Barabasz & Barabasz, 1989) findings that both hypnotizability and pain tolerance can be increased with restricted environmental stimulation. Along the same lines, the prevailing clinical wisdom is that most patients receiving hypnosis for chronic pain should be taught

self-hypnotic skills that generalize beyond the treatment setting. Few, if any, writers have suggested that chronic pain can be modified through a single session, and most of the studies we reviewed with this clinical problem used audiotapes to supplement clinical work. The fact that clinicians who are successful with chronic pain usually provide treatment over multiple sessions introduces the confounds inherent in psychotherapy. We simply cannot determine whether reported reductions in pain result from hypnotic suggestions, some artifacts of the therapeutic relationship, or (perhaps more likely) some combination of these factors. This is an area that is certainly in need of further exploration.

Another question that requires investigation concerns the relative efficacy of hypnotic analgesia for different types of pain problems. For example, it is reasonable to hypothesize that suffering that is maintained by social–financial disincentives may be less likely to respond to suggestions for analgesia. However, there are multiple forms of chronic pain, many of which are known to show varying responses to therapeutic modalities. The aforementioned headache studies suggest, for example, that headache pain responds equally well to hypnosis and autogenic training, but this seems to be the only definitive line of research for a specific pain etiology. Researchers need to determine the types of pain most responsive to hypnotic interventions (e.g., musculoskeletal, neuropathic, malignant or other causes of pain). Clinicians likely have their opinions concerning which types of pain they can treat effectively with hypnosis, but at this point, such conjectures remain as hypotheses to be tested.

Even if the goal of treatment is to increase physical activity, suggestions for pain relief might be of value. A patient who is skeptical about psychological treatment might be given suggestions for pain relief, with the hope that this would not only produce a short-term (and perhaps long-term) reduction in suffering and pain intensity but also increase rapport with the clinician and investment in treatment. This might pave the way for the often more difficult task of changing patients' beliefs about pain etiology and engaging them in the challenging exercises and lifestyle changes that are an integral component of many successful chronic pain treatments.

Summary and Conclusions

Pain is a health care issue that results in significant suffering and financial cost. The time has arrived to determine whether there is enough scientific evidence to justify the use of hypnosis as a viable treatment for pain. For the most part, the focus of most laboratory-based studies has been on examining the effects of hypnosis on perceived pain intensity. The results of these studies demonstrate consistent effects of hypnosis on pain reduction, and have contributed to the theoretical understanding of hypnotic analgesia. More recently, a number of neurophysiological studies have taken these findings to a new level of sophistication.

In this article we sought to provide a comprehensive review of the controlled trials of hypnosis for clinical pain. The findings from acute pain studies demonstrate consistent clinical effects with hypnotic analgesia that are superior to attention or standard care control conditions, and often superior to other viable pain treatments. Although earlier reviews did not provide support for the efficacy of hypnosis for chronic pain, these reviews were based on very few controlled clinical trials. In the past 2 decades, a greater

number of controlled trials of hypnosis for chronic pain have been published. The findings from these studies show that hypnotic analgesia is consistently superior to no treatment but equivalent to relaxation and autogenic training for chronic pain conditions.

A number of important methodological issues surfaced in this review, the primary ones being the importance of measuring hypnotic suggestibility, controlling for nonspecific effects, and considering dose effects. Our findings suggest that acute and chronic pain represent disparate clinical issues for hypnotic analgesia; the treatment of chronic pain involves multidimensional assessment and treatment, and the clinician or hypnotist treating such problems should have an appreciation of the complexity of this problem. Although controlled clinical studies on hypnotic analgesia have substantial room for improvement, at this point the available evidence indicates that hypnosis is a viable intervention for both acute and chronic pain conditions.

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