

A META-ANALYSIS OF HYPNOTICALLY INDUCED ANALGESIA: *How Effective is Hypnosis?*

GUY H. MONTGOMERY, KATHERINE N. DuHAMEL,
AND WILLIAM H. REDD

Mount Sinai School of Medicine, New York, New York

Abstract: Over the past 2 decades, hypnoanalgesia has been widely studied, however, no systematic attempts have been made to determine the average size of hypnoanalgesic effects or establish the generalizability of these effects from the laboratory to the clinic. This study examines the effectiveness of hypnosis in pain management, compares studies that evaluated hypnotic pain reduction in healthy volunteers vs. those using patient samples, compares hypnoanalgesic effects and participants' hypnotic suggestibility, and determines the effectiveness of hypnotic suggestion for pain relief relative to other nonhypnotic psychological interventions. Meta-analysis of 18 studies revealed a moderate to large hypnoanalgesic effect, supporting the efficacy of hypnotic techniques for pain management. The results also indicated that hypnotic suggestion was equally effective in reducing both clinical and experimental pain. The overall results suggest broader application of hypnoanalgesic techniques with pain patients.

Hypnosis has been used as a psychological technique for treatment of a broad range of disorders and illnesses. For example, it has been used in treating phobias, depression, anorexia nervosa, dissociative identity disorder, psychotic disorders, posttraumatic stress disorders, obesity, smoking, and somatization disorders (see Rhue, Lynn, & Kirsch, 1993). Even given the breadth of treatment contexts, hypnosis is perhaps best known as a pain management technique. Indeed, this popularity may be due to longstanding reports of pain relief with hypnosis during aversive medical procedures (e.g., Esdaile, 1957). Hypnosis has been demonstrated to relieve pain in patients with headache (Spinhoven, Linssen, Van Dyck, & Zitman, 1992; ter Kuile et al., 1994; Van Dyck, Zitman, Linssen, & Spinhoven, 1991), burn injury (Patterson, Everett, Burns, & Marvin, 1992; Patterson & Ptacek, 1997; Wakeman & Kaplan, 1978), heart

Manuscript submitted September 5, 1999; final revision received September 7, 1999.

¹Address correspondence to Guy H. Montgomery, Ph.D., Assistant Professor, Cancer Prevention and Control Program, Derald H. Rittenberg Cancer Center, Mount Sinai School of Medicine, Box 1130, One Gustave L. Levy Place, New York, NY 10029-6574 or guy.montgomery@mountsinai.org.

The *International Journal of Clinical and Experimental Hypnosis*, Vol. 48, No. 2, April 2000 134-149
© 2000 The *International Journal of Clinical and Experimental Hypnosis*

disease (Weinstein & Au, 1991), arthritis (Haanen et al., 1991; Horton & Mitzdorf, 1994), cancer (Katz, Kellerman, & Ellenberg, 1987; D. Spiegel & Bloom, 1983; Syrjala, Cummings, & Donaldson, 1992; Wall & Womack, 1989), dental problems (Stam, McGrath, & Brooke, 1984), eczema (Hajek, Radil, & Jakoubek, 1991), and chronic back problems (Melzack & Perry, 1975; Spinhoven & Linssen, 1989). Although there are a number of studies that examine the effects of hypnotic suggestion for clinical pain management (e.g., Barabasz & Barabasz, 1989), and there have been several review articles attempting to summarize these studies (e.g., Wadden & Anderton, 1982; and National Institutes of Health technology assessment panel on integration of behavioral and relaxation approaches into the treatment of chronic pain and insomnia, 1996), to our knowledge there have been no attempts to rigorously quantify the analgesic impact of hypnotic suggestion *across studies*.

That is, it is unknown what proportion of people demonstrate pain relief following hypnotic interventions. This lack of quantification is surprising, given the managed health care industry's emphasis on treatment efficacy and the general public's rising interest in, and use of, unconventional therapies for the treatment of physical problems (Eisenberg et al., 1993). The purpose of this study is: (a) to determine the percentage of people who benefit from hypnoanalgesic suggestions, (b) to explore whether results based on empirical work in the laboratory generalize to medical settings and whether the effects of hypnosis are limited to a particular segment of the population (e.g., highly suggestible individuals), and (c) to explore whether the effects of hypnoanalgesic suggestions are less effective, equally effective, or more effective than other psychological interventions (e.g., relaxation training) in providing pain relief.

Meta-analysis (Hunter & Schmidt, 1990; Smith, Glass, & Miller, 1980) provides an established methodology for evaluating the effectiveness of hypnosis for pain relief across study samples in the published literature. In summary, meta-analysis is the organization and integration of previously published data through calculation of effect sizes. An effect size is a standardized estimate of the magnitude of a study effect that permits direct comparisons of effects across studies. In addition, statistical analyses of effect sizes can provide a better understanding of cumulative research findings for an area, or subject, of research interest than traditional narrative review articles (Hunter & Schmidt, 1990). Although previous meta-analyses have supported the use of hypnosis as an effective adjunct to both cognitive-behavioral (Kirsch, Montgomery, & Sapirstein, 1995) and psychodynamic psychotherapies (Smith et al., 1980) for a variety of psychological disorders, the specific effects of hypnotic interventions for pain relief have not been addressed with this statistical technique.

The primary aim of this study is to estimate the proportion of people who benefit from hypnotic suggestions for pain relief. To achieve this goal, we will use meta-analytic statistical techniques to estimate effect sizes for studies that compared hypnoanalgesic suggestion to no-treatment or standard-treatment conditions. Secondary aims of this study are to explore potential differences in the magnitude of pain relief due to participant sample characteristics (i.e., clinical vs. experimental pain, level of suggestibility) and to compare the treatment efficacy of hypnotic interventions with that of nonhypnotic psychological interventions in providing pain relief.

At this point in the development of the hypnosis literature, it is not clear whether patients enduring clinical pain demonstrate similar levels of hypnotically suggested pain relief as healthy volunteers experiencing experimental pain. It has been argued that clinical patients should demonstrate greater hypnotic pain reduction than healthy volunteers based on data showing that hypnosis has greater impact on pain suffering than on pain sensation (see Holroyd, 1996). Because pain patients are likely to suffer to a much greater degree than healthy volunteers undergoing experimental pain procedures, pain patients may enjoy greater benefit from hypnotic interventions relative to experimental volunteers. We will use meta-analytic techniques to explore the possibility that pain patients demonstrate greater hypnoanalgesic effects.

A second participant characteristic potentially linked to hypnoanalgesic effects is the participant's level of suggestibility. Previous reports have indicated that hypnoanalgesic effects should be larger for more suggestible participants (Barabasz & Barabasz, 1989; Hilgard & Morgan, 1975; Miller & Bowers, 1986; H. Spiegel & Spiegel, 1978). Although this position is widely accepted (Holroyd, 1996), it is not certain that individuals high in suggestibility will demonstrate greater hypnotically induced pain reduction than those of moderate suggestibility, or whether those of moderate suggestibility will outperform participants of low suggestibility. Given that most people score in the middle range on tests of hypnotic suggestibility (Hilgard, Weitzenhoffer, Landes, & Moore, 1961), it is important to estimate the benefits of hypnosis (i.e., effect size) for people of moderate hypnotic suggestibility, because they make up the largest segment of the population.

The American Psychological Association, through the Division of Clinical Psychology, has recommended that the effectiveness of psychological interventions should be emphasized to the public (Task force on promotion and dissemination of psychological procedures, 1995). Indeed, criteria for empirically validated psychological treatments have been proposed for "well-established treatments," and "probably efficacious treatments" (Chambless et al., 1998; Task Force on Promotion and Dissemination of Psychological Procedures, 1995). If hypnosis is revealed as an effective method for reducing pain, it is then important to

estimate the effects of hypnosis relative to other frequently used psychological interventions for pain management. In the present study, meta-analyses will be used to compare the effectiveness of hypnosis to that of nonhypnotic psychological pain management strategies on the basis of their ability to provide pain relief. The finding that hypnotic suggestions for pain relief are at least as effective as other cognitive-behavioral interventions would empirically validate the use of hypnosis for pain management and support its use in situations where hypnosis is more efficient or specifically requested by patients suffering pain.

As the primary focus of this paper is to statistically estimate the effectiveness of hypnotic procedures for pain relief, we limited this first sample of studies to those that directly compared hypnotherapy to no-treatment, wait list, or standard-treatment control groups on measures of pain. For the comparison of hypnosis to other psychological pain management strategies, we changed the criteria and included studies that contained both hypnotic and nonhypnotic psychological treatment groups but not necessarily control groups as described above.

METHOD

Studies included in the present sample were identified from previous reviews of this literature (Chaves & Dworkin, 1997; Ellis & Spanos, 1994; Genuis, 1995; Holroyd, 1996; Spinhoven, 1988). We also conducted a computer search of the PsycLIT database from 1974 to 1997, using the search terms *hypnosis and pain*, *hypnosis and analgesia*, *hypnotherapy and pain*, and *hypnotherapy and analgesia*. The computer search algorithm was set to accept plurals (i.e., *hypnotherapies*, *pains*, and word variants (i.e., *hypnotically*, *hypnotize*, *hypnotizability*, *painful*, *analgesic*). Initial inclusion criteria were as follows: (a) a hypnotic intervention intended to reduce pain was administered to at least one group of subjects; (b) the inclusion of a no-treatment or standard-treatment control group; and (c) sufficient data (including some form of pain measurement on a continuous scale) were reported to allow calculation of effect sizes (Hunter & Schmidt, 1990; Smith et al., 1980). For the comparison of hypnosis to cognitive-behavioral treatments, the inclusion of a cognitive-behavioral treatment was substituted for the inclusion of a no-treatment or standard-treatment control group (point b above).

In several papers with clinical pain samples, control groups were treated according to standard clinical practices ("treatment as usual") (Lang, Joyce, Spiegel, Hamilton, & Lee, 1996; Patterson et al., 1992; Syrjala et al., 1992; Wakeman & Kaplan, 1978; Weinstein & Au, 1991). In these experimental studies, hypnosis was used as an adjunct to the prescription of a pain reliever. For example, in the study by Lang and colleagues (1996), radiology patients received analgesic medications throughout the study. However, the amounts and types of medications were controlled for within the study design (i.e., use of medication was a

dependent variable). Medication use was similarly controlled for in studies of burn patients (Patterson et al., 1992; Wakeman & Kaplan, 1978). In each case, study procedures were identical for control groups and experimental groups with the exception that experimental group procedures included the addition of hypnotic suggestions for pain relief.

Following these standardized methods, 41 effect sizes were initially calculated from 18 papers². Effect sizes were based on the pain reports of 933 participants, nearly all of who were randomly assigned to control or hypnotic intervention conditions. Exceptions to strict random assignment were as follows: participants were assigned to treatment conditions sequentially following referral while counterbalancing for order of group assignment between study therapists (Edelson & Fitzpatrick, 1989); participants were alternately placed in one of three treatment groups (Elton, Boggie-Cavallo, & Stanley, 1988); and group membership was determined by odd or even medical chart numbers (Weinstein & Au, 1991). In order to protect against the possibility that studies with greater numbers of dependent variables (pain measures) would have undue influence on the final estimate of hypnotically induced pain reduction (Hunter & Schmidt, 1990), effect sizes were averaged for treatments within studies. For example, if a single study contained two hypnotic treatments and four pain measures, then the four pain measures were averaged for each treatment condition, and the study was represented by these two effect sizes in subsequent analyses. In the present sample of studies, only three studies (Baker & Kirsch, 1993; Girodo & Wood, 1979; Spanos & Katsanis, 1989) contained more than a single treatment, and therefore the risks to statistical independence due to multiple treatments seemed small relative to the benefit of a larger sample of effect sizes for evaluation of participant characteristics. Three additional studies are represented by two (Spanos, Perlini, & Roberston, 1989; Wakeman & Kaplan, 1978), or even three (ter Kuile et al., 1994), effect sizes. However, in these cases, the multiple effect sizes are due to the findings of two separate experiments having been reported within a single paper (Spanos et al., 1989)³ and results having been independently described for separate and diverse sample groups (e.g., community members, patients, students) within papers (ter Kuile et al., 1994;

²It should be noted that, when possible, we based the calculation of effect sizes on the standard deviation within the control groups. We took this approach because of the potential for inflated experimental group standard deviations due to interactions between the hypnotic interventions and participant levels of hypnotic suggestibility. Specifically, if level of suggestibility interacts with hypnoanalgesic effects (a study question), then one would anticipate greater variance within experimental groups. Study data cautiously argues that such an interaction exists.

³In the calculation of the effect size for Experiment 1 in the paper by Spanos, Perlini, and Robertson (1989), results were collapsed across orders of administration for the comparison of the hypnotherapy and control groups as the authors reported no significant effects due to order (p. 287).

Wakeman & Kaplan, 1978). Therefore, the primary analysis of the effectiveness of hypnosis for pain reduction was performed on 27 effect sizes derived from 18 studies. Secondary analysis of differences between clinical and student study samples were based on a comparison of 10 and 17 effect sizes, respectively; nine additional effect sizes were recalculated to compare effect sizes according to reported levels of hypnotic suggestibility; and 27 additional effect sizes were calculated to compare hypnotic to nonhypnotic psychological pain management strategies.

RESULTS

Types of pain, sample sizes, and effect sizes are presented in Table 1. Two outliers from the Wakeman and Kaplan (1978) study were immediately apparent ($d = 15.45$, $d = 17.42$). In order to provide a more accurate estimate of the effects of hypnotherapy for pain reduction and control for the excessive influence of these extraordinary outliers (Abelson, 1995) on the overall mean effect size, we winsorized the data with $g = 2$ (Winer, 1971). All subsequent analyses are based on the winsorized data set unless otherwise noted. In addition, no differences were found between studies that included standard-treatment control groups versus true no-treatment control groups ($p > .10$).

Results revealed a moderate to large effect size, $d = .74$, (Cohen, 1992). To control for possible bias in effect size due to study sample sizes and to take a conservative approach, we weighted effect sizes by the size of the samples from which they were derived and calculated the mean weighted effect size (D) according to procedures described by Hunter and Schmidt (1990). The calculation of variation of D was also weighted for study sample sizes. That is, the deviation of individual study effects sizes from the weighted mean effect size was adjusted for sample size⁴. The results revealed a significant effect of hypnotic interventions in the treatment of pain ($D = .67$, $\text{Var}D = .26$; $p < .01$), indicating that the average participant treated with hypnosis demonstrated greater analgesic response than 75% of participants in standard and no-treatment control groups. Recalculation of the overall treatment effect with the outliers removed ($d = .62$, $D = .59$, $\text{Var}D = .25$) did not significantly differ from the winsorized results ($F = 0.67$, $p > .10$). Therefore, the winsorized results were used for all remaining analyses.

As seen in Table 2, participants experiencing both clinical and experimental pain significantly benefitted from hypnotic interventions ($p < .01$), as indicated by the moderate effect sizes. Interestingly, the two pain groups did not statistically differ from each other in the degree to which they experienced pain relief ($p > .10$), suggesting that hypnotic suggestions for analgesia work equally as well in laboratory and medical settings.

⁴Variation of $D = \sum ni (d_i - D)^2 / \sum ni$ where n is the study sample size, d is the raw effect size, and D is the mean weighted (by study sample size) effect size.

Table 1
Study Characteristics and Mean Effect Sizes by Publication Date

Study	Participants	Type of Pain	<i>n</i>	<i>d</i>
Wakeman et al. (1978)	patients	burn	24	15.45
Wakeman et al. (1978)	patients	burn	18	17.42
Girodo & Wood (1979)	students	cold pressor	20	-0.01
Girodo & Wood (1979)	students	cold pressor	20	1.50
Girodo & Wood (1979)	students	cold pressor	20	-0.45
Stam et al. (1980)	students	cold pressor	20	0.12
Spanos et al. (1984)	students	cold pressor	45	0.47
Spanos et al. (1985)	students	cold pressor	42	0.94
Tripp & Marks (1986)	students	cold pressor	28	0.88
Stam et al. (1987)	students	ischemic	45	0.12
Elton et al. (1988)	students	ischemic	137	0.70
Edelson et al. (1989)	patients	chronic pain	16	0.94
Spanos et al. (1989)	students	focal pressure	96	0.29
Spanos et al. (1989)	students	focal pressure	60	0.37
Zeltzer et al. (1989)	students	cold pressor	37	1.19
Spanos & Katsanis (1989)	students	focal pressure	20	1.35
Spanos & Katsanis (1989)	students	focal pressure	20	1.81
Spanos et al. (1990)	students	focal pressure	30	1.67
Weinstein & Au (1991)	patients	coronary	32	0.65
Syrjala et al. (1992)	patients	cancer	22	0.10
Patterson et al. (1992)	patients	burn	20	0.72
Baker et al. (1993)	students	cold pressor	20	0.10
Baker et al. (1993)	students	cold pressor	20	0.41
ter Kuile et al. (1994)	community	headache	29	-0.43
ter Kuile et al. (1994)	patients	headache	36	0.34
ter Kuile et al. (1994)	students	headache	26	0.62
Lang et al. (1996)	patients	radiological procedures	30	1.01

Note. Ischemic, cold pressor, and focal pressure are experimental pain stimuli.

In a between-groups analysis of variance, hypnotic analgesic effects were found to differ according to participants' levels of suggestibility, $F = 5.26$, $p < .02$ (see Table 3). For the purposes of this analysis, study participants not identified according to levels of suggestibility were designated as being in the mid-range of suggestibility, because most participants in these studies would fall into this category if tested and the numbers of highs and lows should be relatively even. Post hoc Tukey tests revealed that individuals in the high hypnotic suggestibility range have greater pain relief following hypnotic interventions than those in the low range, $p < .05$. No other level of suggestibility between group comparisons were statistically significant (i.e., participants in the midrange did not differ from those in the high or low range of hypnotic suggestibility, $p > .05$). However, these between-group findings must be viewed with some

Table 2
Population Effect Sizes as a Function of Type of Pain

Type of Pain	<i>n</i>	<i>d</i>	<i>D</i>	Variation of <i>D</i>
Clinical Pain	10	0.80	0.74	0.33
Experimental Pain	17	0.70	0.64	0.24

Note. Effect sizes based on types of pain are significantly greater than zero ($p < .01$) but did not differ between clinical and experimental pain ($p > .10$).

Table 3
Population effect sizes as a function of level of hypnotic suggestibility.

Level of Suggestibility	<i>n</i>	<i>d</i>	<i>D</i>	Variation of <i>D</i>
High	7	1.22	1.16	0.21
Medium	24	0.64	0.64	0.24
Low	4	0.10	-0.01	0.19

Note. Effect sizes for high and low levels of suggestibility significantly differ ($p < .05$).

caution due to the small sample sizes (high, $n = 7$; low, $n = 4$) and assignment of the majority of participants to the mid-range of suggestibility.

Types of nonhypnotic psychological treatment, sample sizes, and effect sizes for comparisons of hypnosis to nonhypnotic psychological interventions are presented in Table 4. Results of the comparison of hypnotically suggested analgesia with other nonhypnotic psychological pain management strategies found no differences in effectiveness between these treatment strategies, $d = .12$, $D = .11$, $\text{Var}D = .62$; $p > .10$. The results indicate that the average participant treated with hypnosis demonstrated equivalent analgesic responses to participants in alternate psychological treatment groups.

DISCUSSION

The results of the present study demonstrate that hypnotic suggestion is an effective analgesic based on analyses of 27 effect sizes and more than 900 participants. For 75% of the population, hypnosis provided substantial pain relief. The magnitude of the hypnoanalgesic effect did not differ for clinical and healthy volunteer samples, however, hypnoanalgesic effects seem to differ according to levels of hypnotic suggestibility, especially when people highest in suggestibility are compared to those lowest in suggestibility. The limitations of our sample size preclude stronger conclusions on the impact of hypnotic suggestibility on analgesic effect, yet it should be noted that our mid-range group (made

Table 4
Study Characteristics and Mean Effect Sizes by Publication Date for Comparison of Hypnotic to Nonhypnotic Psychological Treatments

Study	Type of Nonhypnotic Treatment	<i>n</i>	<i>d</i>
Girodo & Wood (1979)	rationale and self-statement	20	.23
Girodo & Wood (1979)	self-statement	20	1.45
Girodo & Wood (1979)	task motivational instructions	20	1.58
Girodo & Wood (1979)	rationale and self-statement	20	-.83
Girodo & Wood (1979)	self-statement	20	.44
Girodo & Wood (1979)	task motivational instructions	20	.53
Girodo & Wood (1979)	rationale and self-statement	20	-1.27
Girodo & Wood (1979)	self-statement	20	0.00
Girodo & Wood (1979)	task motivational instructions	20	.08
Stam & Spanos (1980)	analgesia suggestion	30	.04
Spanos et al. (1984)	instruction	60	-.19
Spanos et al. (1985)	"do whatever you want"	42	-.37
Spanos et al. (1985)	stress inoculation	42	-.16
Tripp and Marks (1986)	relaxation and analgesia suggestions	28	-.28
Tripp and Marks (1986)	analgesia suggestion alone	28	.53
Katz et al. (1987)	play	36	-.02
Edelson & Fitzpatrick (1989)	cognitive behavioral training	18	.16
Spanos & Katsanis (1989)	nonhypnotic (suggested) analgesia	30	.50
Harmon et al. (1990)	relaxation and breathing exercises	60	1.98
Spanos et al. (1990)	analgesia instruction	66	-.45
Patterson et al. (1992)	attention and information	20	.46
Spinhoven et al. (1992)	autogenic training	46	-.19
Syrjala et al. (1992)	therapist contact	23	.38
Syrjala et al. (1992)	cognitive behavioral training	23	.28
ter Kuile et al. (1994)	autogenic training	29	-1.56
ter Kuile et al. (1994)	autogenic training	29	-.45
ter Kuile et al. (1994)	autogenic training	22	.37
Hypnotic Analgesia			

up of the largest number of effect sizes) demonstrated an effect size that did not statistically differ from the high hypnotic suggestibility group effect size. This finding suggests that a majority of the population (i.e., excluding people scoring in the low hypnotic suggestibility range) should benefit to a large extent from hypnotically suggested analgesia. Indeed, hypnotically suggested analgesia is at least as effective as nonhypnotic psychological interventions for pain management (e.g., cognitive-behavioral) and should be considered as a potential pain management strategy when discussing treatment modality options with patients.

Hypnotically induced pain reduction has been criticized on the basis that pain reports are subjective and patients may produce reports of reduced pain due to social demand characteristics. Potentially, the above effect sizes may represent participants' desire to please experimenters rather than "true" estimates of pain relief. Nevertheless, this possibility seems unlikely for two reasons. First, hypnotic analgesia has been demonstrated with behavioral measures of pain (e.g., Lang et al., 1996; Wakeman & Kaplan, 1978; Weinstein & Au, 1991). Both Lang and colleagues (1996) and Wakeman and Kaplan (1978) used changes in pain medication use as a dependent variable. These effect sizes were not significantly less than the remaining effect sizes in clinical pain studies. Although patients may report less pain to please an experimenter, it seems less likely that patients would actively short their morphine dose and endure increased suffering to achieve this goal. Second, a report published in 1995 supports the existence of physiological correlates of hypnoanalgesic effects (Kiernan, Dane, Phillips, & Price, 1995). Confirmation of physiological changes associated with hypnoanalgesic effects would argue against a simple compliance explanation of the present findings. Due to the Kiernan and colleagues' results, it seems more likely that hypnotic suggestion is effective in eliciting pain relief. Therefore, our understanding of hypnoanalgesic effects may benefit most by exploring mechanisms consistent with modern theories of hypnosis, such as sociocognitive (Kirsch, 1991; Spanos, 1991) or neodissociation theories (Hilgard, 1991), rather than attributing hypnotic effects entirely to compliance factors.

It should be noted that few current practitioners of hypnosis view it as a stand-alone therapy. Rather, hypnotic suggestion is more commonly used adjunctly to psychodynamic, cognitive-behavioral, or even pharmacological therapies. Recent data strongly support the advantages of adding hypnosis to cognitive-behavioral psychotherapy in general (Kirsch et al., 1995), and the present results strongly suggest the efficacy of the addition of hypnosis to nonhypnotic pain management strategies. In clinical practice, therefore, the addition of hypnotic suggestions for pain relief to standard protocols appears prudent as the majority of patients are likely to benefit. There is no evidence that harm would be done when working with appropriately trained health professionals, and effective hypnoanalgesic interventions can be rather brief and cost-effective (e.g., one session; Patterson et al., 1992).

Whether hypnotically suggested analgesia is considered a primary treatment modality or an adjunctive treatment, the question of its empirical validation remains. The present results support the view that hypnotically suggested analgesia meets the criteria for a "well-established treatment" (superior to pill or psychological placebo or to another treatment) (Chambless et al., 1998). Randomized studies with

cancer patients (Syrjala et al., 1992) and burn patients (Patterson et al., 1992) demonstrated that hypnotic suggestion was more effective in reducing pain than nonhypnotic psychological interventions. In addition, Edelson and Fitzpatrick (1989) demonstrated that hypnotic suggestion was as effective as a previously "well-established treatment" for chronic pain (cognitive-behavioral therapy) (Chambless et al., 1998), but patients were assigned sequentially rather than randomly to treatment groups in that study. One could argue that the relatively small samples in some of the studies comparing hypnotic suggestion to other treatments is a limitation of this area of research (published Task Force criteria have previously recommend 30 participants per treatment group) (Task Force, 1995). However, the total sample number of more than 800 participants across studies on which the present comparisons are based would appear to mitigate this criticism.

In addition to superiority to another treatment, Chambless et al. (1998) also recommend that the characteristics of the client samples be clearly specified, that the experiments should be conducted with treatment manuals, and that the effects be demonstrated by at least two different investigating teams. Although the study samples were well defined and the studies were conducted by two separate research teams (i.e., Patterson et al., 1992; Syrjala et al., 1992), they were not based on treatment manuals per se. Nevertheless, Chambless and Hollon state that relatively simple treatment interventions are an exception to the manual requirement. Because these brief hypnosis interventions mainly consist of an induction and suggestions for pain relief, the treatment approaches are readily available in the published literature (e.g., Rhue, Lynn, & Kirsch, 1993), and the study procedures are described within the research papers, it would seem that hypnotically suggested analgesia should still be considered a well-established treatment.

In summary, the present study is the first, to our knowledge, to quantify the magnitude of hypnoanalgesic effects. Hypnotic suggestion relieves pain for the majority of people, regardless of the type of pain they are experiencing. Conclusions regarding the influence of individual differences (i.e., hypnotic suggestibility) on outcome should be drawn with some caution due to the relative paucity of controlled studies examining the contributions of individual variables to treatment effects, but the results of the present meta-analysis argue for a broader application of hypnotic suggestion for better pain management, especially as an adjunct to standard treatments in clinical settings. A review of the literature supports the view that hypnotically suggested pain reduction can be classified as a "well-established treatment," and official designation will encourage the application of hypnotic suggestion to a wider range of patients with pain.

REFERENCES

(References marked with an asterisk indicate studies included in meta-analyses.)

- Abelson, R. P. (1995). *Statistics as principled argument*. Hillsdale, NJ: Erlbaum.
- *Baker, S. L., & Kirsch, I. (1993). Hypnotic and placebo analgesia: Order effects and the placebo label. *Contemporary Hypnosis, 10*, 117-126.
- Barabasz, A. F., & Barabasz, M. (1989). Effects of restricted environmental stimulation: Enhancement of hypnotizability for experimental and chronic pain control. *International Journal of Clinical and Experimental Hypnosis, 37*, 217-231.
- Chambless, D. L., Baker, M. J., Baucom, D. H., Beutler, L. E., Calhoun, K. S., Crits-Christoph, P., Daiuto, A., DeRubeis, R., Detweiler, J., Haaga, D. A. F., Johnson, S. B., McCurry, S., Mueser, K. T., Pope, K. S., Sanderson, W. C., Shoham, V., Stickle, T., Williams, D. A., & Woody, S. R. (1998). Update on empirically validated therapies II. *Clinical Psychologist, 51*, 3-16.
- Chambless, D. L. & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*, 7-18.
- Chaves, J. F., & Dworkin, S. F. (1997). Hypnotic control of pain: Historical perspectives and future prospects. *International Journal of Clinical and Experimental Hypnosis, 45*, 356-376.
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*, 155-159.
- *Edelson, J., & Fitzpatrick, J. L. (1989). A comparison of cognitive-behavioral and hypnotic treatments of chronic pain. *Journal of Clinical Psychology, 45*, 316-323.
- Eisenberg, D. M., Kessler, R. C., Foster, C., Norlock, F. E., Calkins, D. R., & Delbanco, T. L. (1993). Unconventional medicine in the United States: Prevalence, costs, and patterns of use (see comments). *New England Journal of Medicine, 328*, 246-252.
- Ellis, J. A., & Spanos, N. P. (1994). Cognitive-behavioral interventions for children's distress during bone marrow aspirations and lumbar punctures: A critical review. *Journal of Pain and Symptom Management, 9*, 96-108.
- *Elton, D., Boggie-Cavallo, P., & Stanley, G. V. (1988). Group hypnosis and instructions of personal control in the reduction of ischaemic pain. *Australian Journal of Clinical and Experimental Hypnosis, 16*, 31-37.
- Esdaile, J. (1957). *Hypnosis in medicine and surgery*. New York: Julian.
- Genuis, M. L. (1995). The use of hypnosis in helping cancer patients control anxiety, pain, and emesis: A review of recent empirical studies. *American Journal of Clinical Hypnosis, 37*, 316-325.
- *Girodo, M., & Wood, D. (1979). Talking yourself out of pain: The importance of believing that you can. *Cognitive Therapy and Research, 3*, 23-33.
- Haanen, H. C. M., Hoenderdos, H. T. W., van Romunde, L. K. J., Hop, W. C. J., Mallee, C., Terwiel, J. P., & Hekster, G. B. (1991). Controlled trial of hypnotherapy in the treatment of refractory fibromyalgia. *Journal of Rheumatology, 18*, 72-75.
- Hajek, P., Radil, T., & Jakoubek, B. (1991). Hypnotic skin analgesy in healthy individuals and patients with atopic eczema. *Homeostasis in Health and Disease, 33*, 156-157.
- *Harmon, T. M., Hynan, M. T., & Tyre, T. E. (1990). Improved obstetric outcomes using hypnotic analgesia and skill mastery combined with childbirth education. *Journal of Consulting and Clinical Psychology, 58*, 525-530.
- Hilgard, E. R. (1991). A neodissociation interpretation of hypnosis. In S. J. Lynn & J. W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp. 83-104). New York: Guilford.
- Hilgard, E. R., & Morgan, A. H. (1975). Heart rate and blood pressure in the study of laboratory pain in man under normal conditions and as influenced by hypnosis. *Acta Neurobiologiae Experimentalis, 35*, 741-759.
- Hilgard, E. R., Weitzenhoffer, A. M., Landes, J., & Moore, R. K. (1961). The distribution of susceptibility to hypnosis in a student population: a study using the Stanford Hypnotic Susceptibility Scale. *Psychological Monographs, 75*, 1-22.

- Holroyd, J. (1996). Hypnosis treatment of clinical pain: Understanding why hypnosis is useful. *International Journal of Clinical and Experimental Hypnosis*, *44*, 33-51.
- Horton, J. R., & Mitzdorf, U. (1994). Clinical hypnosis in the treatment of rheumatoid arthritis. *Psychologische Beitrage*, *36*, 205-212.
- Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis: Correcting error and bias in research findings*. Newbury Park, CA: Sage Publications.
- *Katz, E. R., Kellerman, J., & Ellenberg, L. (1987). Hypnosis in the reduction of acute pain and distress in children with cancer. *Journal of Pediatric Psychology*, *12*, 379-394.
- Kiernan, B. D., Dane, J. R., Phillips, L. H., & Price, D. D. (1995). Hypnotic analgesia reduces R-III nociceptive reflex: further evidence concerning the multifactorial nature of hypnotic analgesia. *Pain*, *60*, 39-47.
- Kirsch, I. (1991). The social learning theory of hypnosis. In S. J. Lynn & J. W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp. 439-466). New York: Guilford.
- Kirsch, I., Montgomery, G., & Sapirstein, G. (1995). Hypnosis as an adjunct to cognitive-behavioral psychotherapy: A meta-analysis. *Journal of Consulting and Clinical Psychology*, *63*, 214-220.
- *Lang, E. V., Joyce, J. S., Spiegel, D., Hamilton, D., & Lee, K. K. (1996). Self-hypnotic relaxation during interventional radiological procedures: Effects on pain perception and intravenous drug use. *International Journal of Clinical and Experimental Hypnosis*, *44*, 106-119.
- Melzack, R., & Perry, C. (1975). Self-regulation of pain: The use of alpha-feedback and hypnotic training for the control of chronic pain. *Experimental Neurology*, *46*, 452-469.
- Miller, M. E., & Bowers, K. S. (1986). Hypnotic analgesia and stress inoculation in the reduction of pain. *Journal of Abnormal Psychology*, *95*, 6-14.
- *Patterson, D. R., Everett, J. J., Burns, G. L., & Marvin, J. A. (1992). Hypnosis for the treatment of burn pain. *Journal of Consulting and Clinical Psychology*, *60*, 713-717.
- Patterson, D. R., & Ptacek, J. T. (1997). Baseline pain as a moderator of hypnotic analgesia for burn injury treatment. *Journal of Consulting and Clinical Psychology*, *65*, 60-67.
- Rhue, J. W., Lynn, S. J., & Kirsch, I. (Eds.) (1993). *Handbook of Clinical Hypnosis*. Washington, DC: American Psychological Association.
- Smith, M. L., Glass, G. V., & Miller, T. I. (1980). *The benefits of psychotherapy*. Baltimore: Johns Hopkins University Press.
- Spanos, N. P. (1991). A sociocognitive approach to hypnosis. In S. J. Lynn & J. W. Rhue (Eds.), *Theories of hypnosis: Current models and perspectives* (pp. 324-361). New York: Guilford.
- *Spanos, N. P., Kennedy, S. K., & Gwynn, M. I. (1984). Moderating effects of contextual variables on the relationship between hypnotic susceptibility and suggested analgesia. *Journal of Abnormal Psychology*, *93*, 285-294.
- *Spanos, N. P., Ollerhead, V. G., & Gwynn, M. I. (1985). The effects of three instructional treatments on pain magnitude and pain tolerance: Implications for theories of hypnotic analgesia. *Imagination, Cognition and Personality*, *5*, 321-337.
- *Spanos, N. P., & Katsanis, J. (1989). Effects of instructional set on attributions of nonvolition during hypnotic and nonhypnotic analgesia. *Journal of Personality and Social Psychology*, *56*, 182-188.
- *Spanos, N. P., Perlini, A. H., & Roberston, L. A. (1989). Hypnosis, suggestion, and placebo in the reduction of experimental pain. *Journal of Abnormal Psychology*, *98*, 285-293.
- *Spanos, N. P., Perlini, A. H., Patrick, L., Bell, S., & Gwynn, M. I. (1990). The role of compliance in hypnotic and nonhypnotic analgesia. *Journal of Research in Personality*, *24*, 433-453.
- Spiegel, D., & Bloom, J. R. (1983). Group therapy and hypnosis reduce metastatic breast carcinoma pain. *Psychosomatic Medicine*, *45*, 333-339.
- Spiegel, H., & Spiegel, D. (1978). *Trance and treatment: Clinical uses of hypnosis*. Washington, DC: American Psychiatric Press.

- Spinhoven, P. (1988). Similarities and dissimilarities in hypnotic and nonhypnotic procedures for headache control: A review. *American Journal of Clinical Hypnosis*, 30, 183-194.
- Spinhoven, P., & Linssen, A. C. G. (1989). Education and self-hypnosis in the management of low back pain: a component analysis. *British Journal of Clinical Psychology*, 28, 145-153.
- *Spinhoven, P., Linssen, A. C. G., Van Dyck, R., & Zitman, F. G. (1992). Autogenic training and self-hypnosis in the control of tension headache. *General Hospital Psychiatry*, 14, 408-415.
- *Stam, H. J., & Spanos, N. P. (1980). Experimental designs, expectancy effect, and hypnotic analgesia. *Journal of Abnormal Psychology*, 89, 751-762.
- Stam, H. J., McGrath, P. A., & Brooke, R. I. (1984). The effects of a cognitive-behavioral treatment program on temporomandibular pain and dysfunction syndrome. *Psychosomatic Medicine*, 46, 534-545.
- *Stam, H. J., & Spanos, N. P. (1987). Hypnotic analgesia, placebo analgesia, and ischemic pain: The effects of contextual variables. *Journal of Abnormal Psychology*, 96, 313-320.
- *Syrjala, K. L., Cummings, C., & Donaldson, G. W. (1992). Hypnosis or cognitive behavioral training for the reduction of pain and nausea during cancer treatment: A controlled clinical trial. *Pain*, 48, 137-146.
- Task force on promotion and dissemination of psychological procedures. (1995). Training in and dissemination of empirically validated psychological treatments: Reports and recommendations. *Clinical Psychologist*, 48, 3-23.
- *ter Kuile, M. M., Spinhoven, P., Linssen, A. C. G., Zitman, F. G., Van Dyck, R., & Rooijmans, H. G. M. (1994). Autogenic training and cognitive self-hypnosis for the treatment of recurrent headaches in three different subject groups. *Pain*, 58, 331-340.
- *Tripp, E. G., & Marks, D. (1986). Hypnosis, relaxation and analgesia, suggestions for the reduction of reported pain in high and low-suggestible subjects. *Australian Journal of Clinical and Experimental Hypnosis*, 14, 99-113.
- Van Dyck, R., Zitman, F. G., Linssen, A. C. G., & Spinhoven, P. (1991). Autogenic training and future oriented hypnotic imagery in the treatment of tension headache: outcome and process. *International Journal of Clinical and Experimental Hypnosis*, 39, 6-23.
- Wadden, T. A., & Anderton, C. H. (1982). The clinical use of hypnosis. *Psychological Bulletin*, 91, 215-243.
- *Wakeman, R. J., & Kaplan, J. Z. (1978). An experimental study of hypnosis in painful burns. *American Journal of Clinical Hypnosis*, 21, 3-12.
- Wall, V. J., & Womack, W. (1989). Hypnotic versus active cognitive strategies for alleviation of procedural distress in pediatric oncology patients. *American Journal of Clinical Hypnosis*, 31, 181-191.
- *Weinstein, E. J., & Au, P. K. (1991). Use of hypnosis before and during angioplasty. *American Journal of Clinical Hypnosis*, 34, 29-37.
- Winer, B. J. (1971). *Statistical Principles in Experimental Design* (2nd ed.). New York: McGraw Hill.
- *Zeltzer, L. K., Fanurik, D., & LeBaron, S. (1989). The cold pressor pain paradigm in children: Feasibility of an intervention model (part II). *Pain*, 37, 305-313.

Eine Meta-Analyse von hypnotischer Analgesie: Wie effektiv ist Hypnose?

Guy H. Montgomery, Katherine N. DuHamel, und William H. Redd

Zusammenfassung: In den letzten zwei Jahrzehnten wurde hypnotische Analgesie vielfach untersucht. Es wurden jedoch keine systematischen Versuche unternommen, das Ausmaß der hypno-analgetischen Wirkung zu bestimmen oder die Verallgemeinerbarkeit von Ergebnissen in Relation zu Patienten-Untergruppen zu setzen. Die vorliegende Studie untersucht

folgendes: die Wirksamkeit von Hypnose bei Schmerzbewältigung; vergleicht Untersuchungen zur suggerierter Schmerzminderung bei gesunden Vpn. mit solchen, die Patientstichproben verwendeten; vergleicht die hypno-analgetische Wirkung mit der hypnotischen Suggestibilität der Probanden; und bestimmt die Wirksamkeit der suggerierten Schmerzminderung in Relation zu anderen, nicht-hypnotischen psychologischen Interventionen. Eine Meta-Analyse von 18 Untersuchungen ermittelte eine mäßige bis starke hypno-analgetische Wirkung, d. h. die Wirksamkeit von Hypnotherapie bei Schmerzbewältigung wird bestätigt. Die Ergebnisse deuten weiterhin an, daß die hypnotische Suggestion bei Minderung von klinischem sowie experimentell suggeriertem Schmerz gleichermaßen effektiv war. Allgemein deuten die Ergebnisse auf eine breitere Anwendung von hypnotischer Analgesie bei Schmerzbewältigung.

ROSEMARIE GREENMAN

University of Tennessee, Knoxville, TN, USA

**Une meta-analyse de l'analgésie induite par hypnose:
comment l'hypnose est-elle efficace?**

Guy H. Montgomery, Katherine N. DuHamel, et William H. Redd

Résumé: Depuis plus de 20 ans, l'hypnoanalgésie a été largement étudiée. Cependant aucune tentative systématique n'a été effectuée pour déterminer la dimension des effets analgésiques ou n'a établi la généralisation des découvertes de laboratoire au cas des patients. Cette étude examine l'efficacité de l'hypnose sur le traitement de la douleur, compare des études qui ont étudié la diminution de la douleur en hypnose chez des volontaires en bonne santé versus des études utilisant des cas personnels de patients, elle compare aussi les effets hypnoanalgésiques et la suggestibilité hypnotique des participants. Elle détermine l'efficacité de la suggestion hypnotique pour diminuer la douleur face à toute intervention psychologique non hypnotique. La méta analyse de 18 cas a montré un effet hypnoanalgésique modéré à important prouvant l'efficacité de l'intervention hypnotique dans le traitement de la douleur. Les résultats ont montré également que la suggestion hypnotique était également efficace dans la réduction de la douleur clinique ou expérimentale. La totalité des résultats suggère une application plus large des techniques hypnoanalgésique avec les patients douloureux.

VICTOR SIMON

*Psychosomatic Medicine & Clinical
Hypnosis Institute, Lille, France*

**Un meta-análisis de la analgesia inducida hipnóticamente.
Qué tan eficaz es la hipnosis?**

Guy H. Montgomery, Katherine N. DuHamel, y William H. Redd

Resumen: Ha habido un amplio estudio de la hipnoanalgesia en las dos últimas décadas. Sin embargo, no se han realizado estudios sistemáticos para

determinar el tamaño de los efectos hipnoanalgésicos ni se ha establecido la generalizabilidad de lo encontrado en el laboratorio a las muestras de pacientes. Nuestro estudio examina la efectividad de la hipnosis para controlar el dolor, compara estudios que evaluaron la reducción hipnótica del dolor en voluntarios saludables vs. estudios con muestras de pacientes, compara los efectos hipnoanalgésicos con la sugestibilidad hipnótica de los participantes, y determina la efectividad de la sugestión hipnótica para aliviar el dolor en comparación con otras intervenciones psicológicas pero no hipnóticas. Un meta-análisis de 18 estudios mostró un efecto hipnoanalgésico de moderado a grande, lo que sustenta la eficacia de las técnicas hipnóticas para el control del dolor. Los resultados también indican que la sugestión hipnótica fue igualmente eficaz para reducir tanto el dolor clínico como el experimental. En general estos resultados sugieren una aplicación más amplia de técnicas hipnoanalgésicas para tratar a pacientes con dolor.

ETZEL CARDEÑA
*Uniformed Services University of the Health
Sciences-Bethesda, MD, USA and the
University of Valencia, Spain*