

# CONTEMPORARY HYPNOSIS

ISSN 0960-5290

[www.interscience.wiley.com/journal/ch](http://www.interscience.wiley.com/journal/ch)



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BLACKWELL**

THE JOURNAL OF THE BRITISH SOCIETY OF CLINICAL AND ACADEMIC  
HYPNOSIS PUBLISHED BY JOHN WILEY & SONS

## **HYPNOSIS IN THE ALLEVIATION OF PROCEDURE RELATED PAIN AND DISTRESS IN PAEDIATRIC ONCOLOGY PATIENTS**

**Peter J. Hawkins\***, Christina Liossi<sup>†</sup>, B.W. Ewart<sup>‡</sup>, P. Hatira<sup>\*\*</sup> and V.H. Kosmidis<sup>††</sup>

*\*Reader in Health Psychology University of Sunderland, UK, †Research Student, School of Health Sciences, University of Sunderland, UK, ‡Senior Lecturer in Psychology, University of Sunderland, UK, \*\*Senior Clinical Psychologist, Children's Hospital 'Aglaia Kyriakou', Athens, Greece and ††Director of Oncology Unit, Children's Hospital 'Aglaia Kyriakou', Athens, Greece*

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### **Abstract**

The aims of this study were: (1) to evaluate two different therapeutic approaches, namely direct versus indirect suggestions, in reducing pain during lumbar punctures; and (2) to explore the relationship between hypnotizability and outcome. Thirty children with leukaemia and non-Hodgkin's lymphoma who were undergoing regular lumbar punctures were randomly allocated to two groups. In one group, children were hypnotized and given direct suggestions associated with pain relief whilst undergoing lumbar puncture. In the second group children were given indirect hypnotic suggestions associated with pain relief. After hypnotic intervention, there was a statistically significant reduction over baseline for pain and anxiety during lumbar punctures in both groups. Direct and indirect methods were found to be equally effective. The level of hypnotizability was significantly associated with the magnitude of treatment outcome.

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**Key words:** Hypnosis, pain, children, cancer, lumbar punctures

### **Introduction**

Although cancer is not always painful in its own right, patients with cancer undergo numerous painful procedures for diagnosis, therapy and supportive care, including lumbar puncture, bone marrow aspiration and biopsy. Children with cancer consider painful procedures to be the most difficult part of having cancer and frequent repetition of procedures does not desensitize them to the distress (Weekes and Savedra, 1988; Fowler-Kerry, 1990). Although procedure related pain is often thought of as simple, it may cause suffering, loss of control and impaired quality of life. It is essential, therefore, that intervention for suffering includes concern for, and management of, the pain and distress associated with treatment procedures. Much of the data available on the management of procedure-related pain addresses pharmacological management rather than (adjunctive) psychological procedures.

Although hypnosis is frequently used in clinical practice, controlled studies on the clinical procedures are scarce and have produced conflicting and equivocal results. In

a classic paper on the efficacy of hypnosis for the reduction of pain during bone marrow aspirations, Hilgard and LeBaron (1982) reported the successful use of hypnosis to relieve the pain in 15 of 24 children ranging from 6 to 10 years of age. Interestingly, within those 24 children who had volunteered for hypnosis there was a clear relationship between hypnotizability and the amount of pain reduction achieved: hypnosis was generally more effective for pain relief in those patients who were more highly hypnotizable. Further, some of the 'low hypnotizable' children, though unable to reduce pain with hypnosis, achieved some reduction of anxiety and had less observable pain behaviour due to the relaxation and psychotherapeutic components of the hypnotic intervention.

Zeltzer and LeBaron (1982) treated 27 subjects undergoing bone marrow aspirations and 22 undergoing lumbar punctures with hypnotic and non-hypnotic techniques (e.g. deep breathing) and found significant pain reduction for both techniques, with hypnosis being the most effective. Kellerman et al. (1983) demonstrated that hypnosis reduced pain and anxiety significantly below baseline in a variety of medical procedures, including nine bone marrow aspirations, two lumbar punctures and seven intramuscular injections. No measure of hypnotizability was obtained in either of the above studies. A few studies (e.g. Katz et al., 1987; Wall and Womack, 1989) found hypnosis to be of significant benefit, but no greater than that of non-hypnotic cognitive-behavioural interventions. A careful evaluation of these studies leads to the conclusion that hypnosis has not been clearly demonstrated to add a significant increment to the therapeutic outcome for acute pain.

The aim of the current study was to compare the relative effectiveness of direct versus indirect suggestion and to determine the extent to which pain reduction was associated with hypnotizability in each of the treatments.

## **Method**

### *Design*

Thirty children with leukaemia and non-Hodgkin's lymphoma who were undergoing regular lumbar punctures, were randomly allocated to two experimental groups. Experimental group A was treated with direct hypnotic suggestions for analgesia and experimental group B was given indirect suggestions. (These patients were not given any anxyolytic or oral analgesia prior to lumbar puncture. It should be noted that this was a medical decision.) Hypnotic interventions were given 'live' and were adjusted to the age, developmental level and interests of each child.

### *Hypnotic interventions: Direct suggestions*

The following suggestions were used.

- Request for numbness: 'We'll do some strong magic now . . . first you have to allow your low back go to sleep for few minutes . . . I'll show you how to do it . . . I'll just put my hand up on your back to help it become numb . . . sleepy and numb . . . soft and sleepy.'
- Topical anaesthesia: 'Just imagine painting numbing medicine onto your back.'
- Local anaesthesia: 'Imagine injecting an anaesthetic into your low back . . . feel it flow into your body . . . notice the change in feeling as the area becomes numb.'
- Glove anaesthesia: 'Pay attention to your hand . . . notice how you can feel tingling feelings in that hand . . . let it become numb . . . when it is very numb, touch

that hand to your low back . . . let the numb feeling transfer from your hand to your back.'

- Switchbox: The therapist explained to the child the idea that pain is transmitted by nerves from various parts of the body to the brain, which then sends a 'pain message' back to the body. The patient was asked to choose a switch that could turn off or modulate incoming nerve signals (e.g. a flip, dimmer or pull) situated wherever he or she wanted (e.g. in the brain or near the site of pain). Patients were asked to practise turning off the switches for defined periods of time, starting with 10–15 seconds and working toward longer periods.

### *Indirect suggestions*

The setting sun metaphor and the Mexican food metaphor were used.

See yourself sitting on a beautiful Greek beach at sunset . . . Notice the bright red sun as it descends on the far horizon . . . see the sun gradually sink into the ocean . . . See the colours change from red to purple and then to blue . . . Enjoy the tranquillity . . . tranquillity is available to you whenever you need it, merely by giving yourself your own personal signal to relax . . . Maybe you might enjoy letting your finger and thumb come together to make a magic 'OK' sign . . . that is your signal to experience immediate relaxation whenever you like, if its appropriate at that time.

(Levitan, 1990)

I remember the first time that I ever ate Mexican food . . . I ate meat balls with red pepper in New Mexico. It contained so much red pepper that my nose started running, my eyes watered and my mouth kept burning and hurting no matter how much cold water I drank . . . but I spent the next year living in New Mexico . . . and I don't know how or when but my body changed and adapted . . . or perhaps it was my mind that changed . . . my mouth adapted, so there was no longer any pain . . . almost as if somehow, my mouth had developed a callous.

(Hammond, 1990)

### *Subjects*

Thirty children (18 girls, 12 boys) with leukaemia, and non-Hodgkin's lymphoma aged 6–16 years of age who were undergoing regular lumbar punctures at the Childrens' Hospital in Athens, Greece, participated in the study. All subjects had had 5–6 previous exposures to lumbar puncture prior to the taking of baseline measures of pain. Exclusion criteria for this study were:

1. previous therapy with hypnosis;
2. concurrent treatment during the project with analgesic or psychotropic medication;
3. a major affective disorder or other psychiatric diagnosis.

No patients were excluded with respect to the above criteria.

### *Procedure*

The study involved four procedural steps:

1. assessment of the degree of pain and pain related anxiety during lumbar punctures at baseline;
2. hypnotic treatment (interventions as described above);

3. assessment of the degree of pain and anxiety during the first lumbar puncture in which hypnotherapy was used;
4. measurement of hypnotizability.

Three primary outcome measures (self-report pain, self-report anxiety, observer's report) exist for each subject.

#### *Assessment of pain and anxiety during lumbar punctures at baseline*

Assessment of children's pain and pain related anxiety involved both behavioural observation and self-reports. During the baseline period, an independent observer (trained nurse) was present at the time of the lumbar puncture in the treatment room and completed an observer recorded checklist of distress behaviours (LeBaron and Zeltzer, 1984). The two nurses involved in the assessments, during both baseline assessments and treatment assessments were trained (inter-reliability correlations were established,  $\rho = 0.92$ ). Observations lasted from the time the children entered the treatment room through the period after completion of the procedure. They focused on vocalizations (e.g. crying, whining, or groaning), verbalizations, facial expressions, muscle tension and rigidity, and general appearance. After the children had recovered from the procedure they were asked to describe their experience (e.g. what it had been like, how they had felt, what was helpful and what was not, etc.). The qualitative data elicited by the semi-structured interview has not been included here but will form the focus of further 'follow-up' studies. They were also asked for a retrospective self-rating of pain and anxiety on a six-point rating scale of faces (Whaley and Wong, 1987).

#### *Hypnotic treatment*

Initially, a pre-induction interview was conducted during which the therapist inquired about the patient's likes and dislikes, significant fears, and hopes; reviewed the child's ideas about hypnosis, clarified misconceptions and fully replied to questions. In the following session the patient was introduced to the experience of hypnosis. Hypnosis was induced by visual imagery techniques (favourite place, favourite activity). Following several minutes of hypnotic involvement the patient was given either direct suggestions (request for numbness, topical anaesthesia, local anaesthesia, glove anaesthesia, switch box) in Experimental Group A, or indirect suggestions ('the setting sun' and 'Mexican food' pain metaphors) in Experimental Group B. The session ended with a suggestion that the hypnotic experience would be repeated in the actual treatment room and would provide comfort during the lumbar puncture. Not all suggestions were given to each child. The treatment time was equal for both groups. No attempt was made to give the same suggestions directly and indirectly nor was any attempt made to teach self-hypnosis. The actual lumbar punctures were scheduled to follow during the next five days. At the scheduled time, the child was accompanied to the treatment room by the therapist.

During the preparation for the lumbar puncture the child was encouraged to enter hypnosis although a formal induction was not used.

#### *Assessment of pain and anxiety during lumbar punctures with hypnotherapy*

Within the treatment room, all of the same types of observations (by a different nurse than the one at baseline<sup>1</sup>) and self-reports of pain and anxiety were obtained as in the baseline observation.

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<sup>1</sup>Logistic considerations made this necessary.

*Measurement of hypnotic ability*

At the post-treatment assessment session, the Stanford Hypnotic Clinical Scale for Children (SHCS – Children) developed by Hilgard (1978/1979), and translated into Greek, was applied to obtain a hypnotic susceptibility score. The SHCS – Children is a 20-minute, seven-item scale that is administered to the subjects individually, yielding scores based on the assessment of both behaviour and experience (via verbal reports) and range from 0 to 7. In this study subjects were classified in terms of whether they were low-hypnotizable (score: 0–4) or high-hypnotizable (score: 5–7). This classification is widely accepted (Syrjala et al., 1992), although it should be pointed out that all of Syrjala's subjects were over the age of 18.

**Results**

Table 1 shows the means related to each of the dependent variables.

Table 1. Means and standard deviations (in parentheses) for each of the dependant variables (self-reported pain, self-reported anxiety and observers report) for each group

	Direct		Indirect	
	Baseline	Post-treatment	Baseline	Post-treatment
Self-reported pain	4.5 (0.74)	2.13 (1.3)	4.46 (0.74)	2.0 (1.25)
Self-reported anxiety	4.4 (0.91)	1.67 (1.4)	4.5 (0.74)	1.6 (1.55)
Observers' reports	15.7 (3.8)	9.1 (5.8)	15.1 (4.9)	8.5 (5.4)

*Pain*

A 2-way ANOVA was conducted on the self-report pain scores of both groups.<sup>2</sup> There was no significant effect due to type of suggestion ( $F 0.05$ ;  $p = 0.83$ ). There was a significant effect due to time, that is before and after measures ( $F 102.8$ ;  $p < 0.001$ ). There was no significant interaction effect ( $F 0.08$ ;  $p = 0.78$ ) (see Table 2).

*Anxiety*

A 2-way ANOVA was conducted on the self-report anxiety scores of both groups. There was no significant effect due to type of suggestion on self-reported anxiety ( $F 0.1$ ;  $p = 0.92$ ). There was a significant effect due to time ( $F 105.58$ ;  $p < 0.001$ ). There was no significant interaction effect ( $F 0.13$ ;  $p = 0.72$ ) (see Table 2).

*Observers report*

A 2-way ANOVA was conducted on the observers' reports for both groups. There was no significant effect due to type of suggestion ( $F 0.15$ ;  $p = 0.69$ ), but there was a significant effect due to time ( $F 42.30$ ;  $p < 0.001$ ). No significant interaction effect ( $F < 0.001$ ;  $p = 0.95$ ) was found (see Table 2).

<sup>2</sup>All ANOVAs were conducted with SPSS, and were adjusted for repeated measures where appropriate. Johnson and Den Heyer (1980) discuss the appropriateness of ANOVA with ordinal levels of measurement.

Table 2. Summary of F scores for the two-way ANOVA (main effects: type of suggestion and pre- and post-intervention on self-report pain, anxiety and observers' reports)

	Direct versus indirect suggestion	Pre- versus post-intervention	Interaction
Self-reported pain	F = 0.05 not significant	F = 102.8* significant	F = 0.08 not significant
Self-reported anxiety	F = 0.1 not significant	F = 105.58* significant	F = 0.13 not significant
Observers' reports	F = 0.15 not significant	F = 42.3* significant	F = 0.001 not significant

\* $p < 0.001$

### *Hypnosis method, hypnotizability and treatment outcome*

For each of the dependent variables and for each subject a 'difference score' was obtained by subtracting base-line measures from post-treatment measures. Three 2-way ANOVAs (independent groups) were conducted on the difference scores for pain, anxiety and observers' reports respectively. The factor 'group' is at two levels representing the two experimental groups (direct and indirect method of hypnosis). The factor 'hypnotizability' is represented at two levels (high and low; see procedure section). These analyses allow the interaction of hypnotic method and patient hypnotizability to be explored in respect of their combined effect upon the magnitude of treatment outcomes.

### *Pain*

Consistent with the finding of the previous section, there was no significant effect due to group ( $F 0.35, p = 0.561$ ). There was a significant effect due to hypnotizability ( $F 35.22, p < 0.001$ ) indicating that the magnitude of difference between pre- and post-treatment self-report pain scores was related to hypnotizability for both methods. There was no significant interaction effect ( $F 0.62, p = 0.44$ ).

### *Anxiety*

Consistent with the finding of the previous section, there was no significant effect due to group ( $F 0.74, p = 0.39$ ). There was a significant effect due to hypnotizability ( $F 20.54, p < 0.001$ ) indicating that the magnitude of difference between pre- and post-treatment self-report anxiety scores was related to the subject's hypnotizability. There was no significant interaction effect ( $F 0.17, p = 0.68$ ).

### *Observers reports*

Consistent with the findings of the previous section, there was no significant effect due to group ( $F 0.04, p = 0.83$ ). There was a significant effect due to hypnotizability ( $F 15.52, p < 0.001$ ) indicating that the magnitude of difference between pre- and post-treatment observers' reports was related to the subject's hypnotizability. There was no significant interaction effect ( $F 0.01, p = 0.924$ ).



Table 3. Summary of F scores for the two-way ANOVAs examining the effect of hypnosis method and subject hypnotizability on the magnitude of treatment outcomes

	Group (direct/indirect)	Subject hypnotizability	Interaction effect
Self-reported pain	F = 0.35 not significant	F = 35.22* significant	F = 0.62 not significant
Self-reported anxiety	F = 0.74 not significant	F = 20.54* significant	F = 0.17 not significant
Observers' reports	F = 0.04 not significant	F = 15.52* significant	F = 0.01 not significant

\* $p < 0.001$

## Discussion

It is likely that hypnosis addresses the sensory, affective, cognitive and interpersonal components of childhood pain in different ways and offers a complementary approach to orthodox pain management. When investigators conduct research on a specific problem of pain during procedures in cancer patients they are dealing not only with the anxiety and pain engendered by the specific procedure but also to some extent with an invisible, undercurrent of general anxiety due to the presence of a disease that is highly disruptive of normal living and potentially fatal. However, when pain is evoked repeatedly in procedures, as in lumbar punctures, a patient's anxiety can be aroused simply by entering the treatment room, seeing a needle, etc. Hypnosis, due to its relaxation component affects anxiety directly and is capable of reducing it considerably.

Overall, hypnotizability was related to magnitude of therapeutic outcome. However, the relationship between hypnotizability and method of hypnosis needs further investigation. If hypnotizability is represented as a categorical variable,<sup>3</sup> as claimed by Syrjala, then there is no difference in the efficacy of type of hypnosis on self-reported pain, self-reported anxiety and patients behaviour, according to observers reports (as evidenced by a lack of interaction effects). Further studies are needed to explore these findings as the categorisation proposed by Syrjala may not be appropriate for children. Such studies are necessary to determine the relationship between direct and indirect suggestions with respect to levels of hypnotizability.

The finding that pain reduction was related to the level of hypnotizability is in line with the results reported in some other studies (Hilgard and LeBaron, 1982; Wall and Womack, 1989). Some authors (e.g. Hilgard and Hilgard, 1985) believe that the patients' capacity for hypnosis is a crucial and stable determinant in predicting responsiveness to hypnoanaesthesia. This view is quite contentious, however, with social psychological theorists claiming that hypnotizability is best viewed as a modifiable skill (Gorassini and Spanos, 1986). A third group of clinicians (e.g. Barber, 1980) believe that hypnotic scales measure responses only to direct suggestions and thus are

<sup>3</sup>In other words, a patient is classified as being either high or low in terms of hypnotizability rather than at some point on a multipoint scale of hypnotizability.



of little use in pain control when indirect and more conversational methods might be used. Our study supports the view that even when indirect suggestions for pain control are used, hypnotizability can predict the efficacy of suggested analgesia.

The other question that this study tried to answer was the relative efficacy of direct and indirect suggestions (Lynn et al., 1987, 1988). However, the data do not support the hypothesis that indirect suggestions are superior to direct ones, thus offering confirmatory support for Lynn's analysis of 29 reported studies (Lynn et al., 1993).

For clinical practice, the most important conclusion that can be drawn from the present study, is that hypnosis may be effective for the management of procedure related pain and therefore could be used adjunctively with pharmacological techniques. However, further studies are required as the reported study had no control group and no comment on the efficacy of hypnosis *per se* can therefore be made. A very important clinical consideration is the possible contribution of hypnosis in restoring the patients' sense of self-control, personal efficacy and active participation in their own care. Further research with these techniques is needed to refine the mechanism of hypnotic analgesia and to determine which interventions are effective for which patients and under what circumstances.

### **Acknowledgement**

This paper is based on a doctoral dissertation conducted by Christina Liossi under the supervision of Peter J. Hawkins.

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*Address for correspondence:*

*Dr Peter J. Hawkins,*  
Reader in Health Psychology,  
Sunderland Business School,  
University of Sunderland,  
St Peter's Campus,  
Sunderland, SR1 ODD, UK  
Email: peter.hawkins@sunderland.ac.uk

Received 5 January 1996; revised version accepted 5 August 1997