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ON THE EFFICACY OF HYPNOSIS: A META-ANALYTIC STUDY

Erich Flammer[1] and Walter Bongartz[2]

[1]Department of Politics and Management, University of Konstanz, Germany and
[2]Department of Psychology, University of Konstanz, Germany

Abstract

From 444 studies published until 2002 that investigated the efficacy of hypnosis, 57 randomized clinical studies were selected that compared patients treated exclusively by hypnosis to an untreated control group (or to a group of patients treated by conventional medical procedures). The 57 studies were integrated into a meta-analysis that yielded a weighted average post-treatment effect size of d = 0.56 (medium effect size). For hypnotic treatment of ICD-10 codable disorders (32 studies) the calculation of the weighted mean effect size resulted in d = 0.63. These estimates are conservative since all variables of a given study were used. Most of the studies employed methods of the classic approach to hypnosis. In order to obtain an estimate to which extent non-clinical factors (design-quality, way of comparison of dependent variables) have an influence on the effect sizes, effect sizes were computed for all studies of the original 444 studies that reported the necessary statistical information (N = 133). For those studies with an average effect size of d = 1.07 a massive influence of non-clinical factors was demonstrated with a range from d = 0.56 for randomized studies with group comparisons to d = 2.29 for non-randomized studies using pre-post-comparisons. Out of the 57 randomized studies, only 6 reported numerical values for the correlation between hypnotic suggestibility and treatment outcome with a mean correlation of r = 0.44.

Key words: classical vs modern hypnosis, hypnotherapy, meta-analysis

Introduction

Over the past decades, hypnosis has gained in recognition as a useful therapeutic tool in psychotherapy and medicine (Rhue, Lynn and Kirsch, 1993). However, the claim of hypnosis to represent a psychotherapeutic tool for a broad range of applications is still not thoroughly evaluated. This study aims to evaluate the overall efficacy of hypnosis for psychotherapeutic and medical applications within a meta-analytical framework.

For the assessment of efficacy of psychotherapeutic treatments, meta-analytic procedures gained acceptance. As a measure of efficacy, so-called 'effect sizes' are calculated from the difference between the means of dependent variables for a treated and an untreated patient-group or from the difference before and after a treatment (pre-, post-comparisons). Such effect sizes allow direct comparisons between studies with regard to their efficacy. Frequently used measures for effect sizes are standardized mean differences and correlation coefficients (Hunter and Schmidt, 1990).

There are only a few meta-analytic studies on the efficacy of hypnosis. The classic paper of Smith, Glass and Miller (1980) that marks the beginning of meta-analytic assessment of psychotherapies, reports an effect size of 1.82 (standardized mean difference) and thereby ascribes a very high efficacy to hypnotic treatment. This value, however, is based on only 19 measures from a not exactly specified number of studies. The study on the efficacy of hypnotic techniques by Wadden and Anderton (1982) finds evidence for hypnotherapeutic efficacy in the treatment of pain, bronchial asthma and warts but uses no meta-analytic measures. The efficacy of hypnosis is also confirmed by Grawe, Donati and Bernauer (1994) with regard to pain, sleeping disorders and psychosomatic disorders. But the 19 studies on which the assessment is based are not comparable by usual meta-analytic measures. One issue of the *International Journal of Clinical and Experimental Hypnosis* (April 2000) was devoted to the efficacy of 'hypnosis as an empirically validated clinical intervention'. Out of the corresponding six articles, only one included a meta-analysis of clinical studies; this was the paper by Montgomery, DuHamel and Redd (2000) that reports an effect size of $d = 0.74$. A more extensive unpublished meta-analysis was presented by Rominger et al. (see Revenstorf, 1996). For 36 studies using randomized control groups they find $d = 0.83$. But this investigation takes into consideration not only clinical studies but also analogue studies; it summarizes pre-post comparisons and between-group comparisons and collapses post-treatment and catamnestic data.

This study is an extension of an earlier evaluation of the therapeutic benefit of hypnosis including clinical studies published until 1998 (Bongartz, Flammer and Schwonke, 2002). It intends to yield a broader basis for the evaluation of hypnosis than has been done previously. This means – besides including all relevant studies available – not restricting our analysis to only one type of disorder (e.g. chronic pain) but covering the whole therapeutic spectrum of hypnosis.

We will take into consideration only *clinical studies* in which either disorders are treated that can be coded according to ICD-10 criteria or studies in which hypnosis has been used to support medical interventions. Analogue studies will be excluded. Only those values of the dependent variables measured immediately after completion of treatment (post-treatment data) will enter analysis. No catamnestic data will be taken into account because the expected temporal heterogeneity of catamnestic assessment makes a direct comparison of studies not feasible.

The computed effect sizes do not depend only on the efficacy of the applied interventions but also on non-clinical aspects like the kind of comparison (between-group vs pre-post comparison), the kind of variables (physiological vs subjective measures) and so on. For instance, it has been shown that the kind of comparison itself is crucial, e.g. pre-post comparisons yield significantly higher effect sizes than between-group comparisons (Matt and Navarro, 1997).

Our study will only employ randomized studies comparing a patient-group exclusively treated by hypnosis with an untreated group of patients. For the assessment of the efficacy of hypnosis for medical interventions, patients receiving standard medical treatment are also admitted to the untreated control group (e.g. oncology patients). In order to evaluate the dependence of the effect size on non-clinical factors we will additionally, in a second step, take into account all studies that contain the necessary statistical data.

In order to ensure a neutral and reproducible assessment of our procedure all variables of a given study are used for the computation of effect sizes, i.e. no selection of variables is made.

Method

Identification of relevant studies

Relevant literature has been found by searching the databases PsycInfo and MEDLINE for the period 1887–2002 by using the key words 'Hypn*', 'Hypnotics', 'Psychother*' as well as a combination of these by the operators 'AND', 'OR' and 'NOT'. Moreover, the review by Wadden and Anderton (1982), the book by Rhue et al. (1993) as well as the paper by Kirsch, Montgomery and Sapirstein (1995) have been used. Additional relevant studies were identified by looking through the cited literature in articles already reviewed ('footnote chasing'). This research strategy produced 2650 hits. The exclusion of analogue studies, reviews and non-empirical articles resulted in 444 empirical studies.

Criteria for inclusion

In order to qualify for inclusion in the present meta-analysis, studies had to meet four criteria:

(i) Inclusion of clinical studies only, i.e. studies in which the efficacy of hypnosis was assessed in the treatment of either patients with disorders that could be coded according to ICD-10, or with patients undergoing medical procedures (e.g. in dentistry). Studies that use hypnosis for treatment of warts were also included. On the other hand, studies that intended to merely increase performance without psychotherapeutic indication (e.g. improvement of athletic or academic performances) were excluded.
(ii) The use of a treatment condition that applies only hypnotic interventions (hypnosis-only condition).
(iii) The use of between-group comparisons, i.e. comparing a hypnosis-only condition with a waiting control. The waiting control group was not allowed to include any explicit psychotherapeutic intervention. Studies that used hypnosis for supporting medical interventions (e.g. medical care for burn patients) and provided standard medical care for the hypnosis condition as well as the control condition were also included into the meta-analysis.
(iv) The randomized assignment of patients to the treatment conditions proper.

These criteria were met by 57 studies. For these studies a meta-analysis has been conducted.

In a second step, we investigated the influence of non-clinical factors (e.g. treatment design) on effect sizes. To this end, we expanded the criteria and also admitted studies that did not use a random design and conducted either between-group comparisons or pre-post comparisons. This expansion of the criteria led to 76 additional studies resulting in a total sample of 133 studies. These 133 studies entered a further meta-analysis.

Coding of the studies

Apart from patient characteristics (e.g. inpatients vs outpatients) all 133 studies were coded with regard to study design (randomized vs non-randomized), total sample size (number of patients in hypnosis and control conditions), size of treatment group, size of control group, kind of disorder and kind of comparison (pre-post comparison or between-group comparison).

With respect to the hypnotic interventions used studies were assigned to the categories 'classical hypnosis' or 'modern hypnosis'. Direct suggestions (for relaxation, alleviation of symptoms and for inducing imaginations) have been subsumed under 'classical hypnosis'. Symbolization, utilization of resources, the use of metaphors and indirect suggestions (likewise for relaxation, etc.) have been classified as 'modern hypnosis'. Studies that primarily used classical interventions but included modern elements as well have been assigned to the category 'classical hypnosis'. Likewise, the studies with predominantly modern forms of intervention that used classical elements in addition have been assigned to the category 'modern hypnosis'.

Computation of effect sizes, 'binomial effect size display', 'fail safe N'

In order to avoid distortion of effect sizes by subjective selection, all dependent variables of a given study were used for calculating effect sizes. We supposed that the choice of dependent variables made by the author(s) represented an appropriate operationalization of therapeutic outcome. This guarantees that the computation of the average effect sizes for the individual studies can be reconstructed by other authors as well.

For each dependent variable of a study an effect size was computed from the test statistic reported. Because of the heterogeneous catamnestic data, only the values measured immediately before and after treatment were used for computation of effect sizes

For each study, a mean study effect size (averaging over the effect sizes for each variable in the study) was calculated. Effect size was defined by the pointbiserial correlation coefficient rpb. For computation, the programme of Schwarzer (1989) has been used which permits the conversion of mean differences (difference between treated and untreated group), test statistics (t, F, χ^2) and probabilities (p-values for test statistics) in effect sizes (r_{pb}). The corresponding conversion formulas are listed in the appendix.

Since the original distribution of the effect sizes (r_{pb}) is unknown (the distribution may be oblique, for instance), the assumption of an approximate normal distribution of the effect sizes is justified only after a Fisher's Z-transformation. Therefore, all effect sizes were subjected to a Fisher Z-transformation (Rosenthal, 1984). These transformed correlation coefficients (r_{pb}) can be interpreted straightforwardly (i.e. the difference between r = 0.30 and r = 0.35 corresponds to the difference between r = 0.40 and r = 0.45).

The z-transformed effect size for each study entered a weighted analysis according to Hunter and Schmidt (1990) taking into account the number of patients treated (for formula see the appendix). The binomial effect size display (BESD; Rosenthal and Rubin, 1982) represents the estimated difference between treatment (group) and control group (BESD= 0.50 +/- r/2) with regard to success rates. For example, an r of 0.30 results in binomial effect sizes of 35% and 65%. This means that, without treatment, 35% of patients experience an alleviation of symptoms, whereas 65% of patients can expect alleviation of their symptoms after treatment.

Also, the 'fail safe N' was determined. This measure refers to the 'file drawer problem' (Rosenthal, 1979). The fail safe N indicates the number of studies having an effect size of r = 0 (i.e. no treatment effect at all) which would have to be unpublished ('remaining in the drawer') in order to lower the average effect size of the presented studies to a defined value (e.g. to r = 0.05).

Results

Treatment efficacy

The characteristics of the 57 studies included in the meta-analysis are summarized in Table 1. About 70% of the studies use predominantly hypnotherapeutic interventions that can be assigned to classical hypnosis. Only about 19% of the studies employ predominantly methods of modern hypnosis. This means that not modern hypnotherapeutic interventions but methods of classical hypnosis are used in most of the studies included in this meta-analysis (*methods of classical hypnosis*: direct suggestions for relaxation, imagination and for alleviation of symptoms have been used in 28, direct post-hypnotic suggestions in 4 studies. *Methods of modern hypnosis*: nine studies report the utilization of resources; 16 studies use indirect suggestions for relaxation, imagination or for symptom reduction; 4 studies apply metaphors and 2 studies employ symbolizations.)

Table 1. Study characteristics for the 57 studies of the meta-analysis

		Number of studies
Age of patients	children/adolescents	11
	adults	25
	mixed	6
	no specification	15
Sex of patients	male	4
	female	7
	mixed	41
	no specification	5
Treatment setting	inpatients	11
	outpatients	27
	mixed	2
	no specification	17
Dropouts	referring to 54 studies	6.41%
	no specification	3
Duration of treatment	mean for 42 studies	3.7 weeks
	no specification	15
Catamnesis	mean for 53 studies (with/without catamnesis)	7.6 weeks mean for 22 studies
	with catamnesis	18.27 weeks
	studies without catamnesis	31
	no specification	4
Kind of treatment	classical hypnosis	40
	modern hypnosis	11
	undecidable	6

Table 2 describes the individual studies with regard to their effect sizes, kind of disorder treated, etc. Values from d = 0.2 to d = 0.5 are rated as low, values from d = 0.5 to d = 0.8 as medium and values of d < 0.08 are regarded as large effect sizes (Cohen, 1988). A closer look at the kinds of disorders treated in the studies of our sample reveals that not the whole range of psychotherapeutic practice is represented. Studies on the efficacy of hypnosis in affective disorders, obsessive compulsive disorders or psychotic disorders are missing completely. Furthermore, diagnostic categories such as somatoforme disorders, psychological disorders caused by psychotropic substances (only studies on smoking cessation met the inclusion criteria) or anxiety disorders (only treatment of test anxiety) are numerically under-represented by the available studies so that statements on the efficacy of hypnosis in the treatment of somatoforme disorders, anxiety or addiction are not possible.

Almost half of the studies do not refer to psychotherapeutic indications but to hypnosis as an adjunct for supporting medical procedures.

Computation of the weighted average effect size for all 57 studies produces an r = 0.27 and a d = 0.56. The effect size of r = 0.27 results in a binomial effect size that amounts to 37% and 64%. This means that *without* treatment 37% of the patients benefit from hypnotic intervention, however, *after* treatment 64% of the patients can expect an alleviation of their symptoms. Computation of the fail safe N showed that additionally to the 57 studies included in our study, only the inclusion of a further 254 studies with an effect size of r = 0 would reduce the average effect size from r = 0.27 to r = 0.05.

Even if the diagnostic criteria of ICD-10 are not representatively included in our analysis, we nevertheless have tried to summarize studies according to different fields of application by performing a test of homogeneity in order to identify such subpopulations statistically (Hunter, Schmidt and Jackson, 1982). By doing so the hypothesis was tested that the effect sizes computed for individual studies are estimates of a common true, errorless measured population parameter (i.e. the variance of the estimated true effect sizes is zero). The test yielded an inhomogeneous distribution of effect sizes (256 = 111.28; $p < 0.001$), i.e. the 57 effect sizes for the 57 studies of the meta-analysis do not stem from one population. A disjoint cluster analysis (Hedges and Olkin, 1985), however, failed to identify such subpopulations on a 1% level of significance.

In a following step, we tried to form subgroups from our sample by categorizing the studies according to fields of applications. For this purpose, the studies were grouped into five categories A to E with ICD-10 codable studies falling into the categories A to C. The categories and the mean effect sizes are shown in Table 3. The calculation of the weighted mean effect size for ICD-10 codable studies (N = 32; categories A–C) resulted in an r of 0.30, which equals a d of 0.63.

When trying to confirm the categorization statistically, an analysis of variance that included the weighted (Fisher-Z-transformed) r of the individual studies per category, revealed no significant differences between the categories mentioned (A–E). Applying tests of homogeneity to the categories chosen, only two categories proved to be homogeneous, i.e. category C (anxiety; (27 = 13.08; $p = 0.08$) and category D (support of medical procedures; (218 = 27.89; $p = 0.06$).

As mentioned at the beginning, we intended also to investigate to what extent non-clinical factors (e.g. design of the study) influence the evaluation of the efficacy of hypnosis. For this purpose we categorized 133 studies reporting necessary statistical information with respect to study design (‘randomized’ vs ‘non-randomized’) and kind of comparison (‘pre-post comparison’ vs ‘between-group comparison’). Those studies categorized as ‘randomized and pre-post comparisons’ randomly assigned patients to a

Table 2. Details on the 57 randomized controlled studies

Author	Disorder/field of application	Number of patients *(completers in hypnosis group and control)*	Kind of hypnosis	Duration of treatment *(w = weeks s = sessions ns = not specified)*	Effect size r	Effect size d
(A)						
Attias et al. (1990)	Tinnitus	24	modern	4 s	0.34	0.71
Borkovec and Fowles (1973)	Insomnia	19	classical	3 s	0.08	0.16
Colgan et al. (1988)	Duodenal ulceration	30	classical	10 w	0.38	0.83
Edwards and van der Spuy (1985)	Enuresis	24	classical	Ns	0	0
Ewer and Stewart (1986)	Asthma	39	classical	6 w	0.62	1.57
Felt et al. (1998)	Warts	41	classical	8 w	0.03	0.06
Galovski and Blanchard (1998)	Irritable bowel syndrome	10	modern	12 w	0.70	1.97
Kohen (1995)	Asthma	24	classical	4 w	0.43	0.94
Llaneza-Ramos (1989)	Chronic headaches	35	modern	8 w	0.80	2.70
Maher-Loughnan et al. (1962)	Asthma	55	classical	20 w	0	0
Melis et al. (1991)	Chronic tension headache	26	classical	4 w	0.41	0.89
Raskin et al. (1999)	Hypertension	24	classical	4 s	0.44	0.98
Spanos et al. (1988)	Warts	39	classical	1 s	0.45	1.02
Spanos et al. (1988)	Warts	38	classical	1 w (2 s)	0.34	0.72
Spanos et al. (1990)	Warts	20	classical	1 s	0.41	0.90
Spanos et al. (1993)	Chronic headache	41	classical	4 w	0.04	0.08
ter Kuile et al. (1994)	Recurrent headaches	93	classical	8 w	0.09	0.19
(B)						
Hyman et al. (1986)	Smoking cessation	30	classical	4 w	0.47	1.05
Kaufert et al. (1986)	Smoking cessation	71	classical	1 s	0.40	0.87
Lambe et al. (1986)	Smoking cessation	115	undecidable	2 w	0.15	0.31
Rabkin et al. (1984)	Smoking cessation	130	classical	ns	0.36	0.77
Spanos et al. (1995)	Smoking cessation	23	classical	2 s	0.40	0.88
Valboe and Eide (1996)	Smoking cessation	130	classical	2 w	0.11	0.22
Williams and Hall (1988)	Smoking cessation	40	classical	1 s	0.56	1.34

Continued

Table 2. Continued

Author	Disorder/field of application	Number of patients *(completers in hypnosis group and control)*	Kind of hypnosis	Duration of treatment *(w = weeks s = sessions ns = not specified)*	Effect size r	Effect size d
(C)						
Boutin and Tosi (1983)	Test anxiety	16	modern	6 w	0.46	1.05
Brom et al. (1989)	PTSD	52	undecidable	Ns	0.13	0.27
Johnson and Johnson (1984)	Test anxiety	15	undecidable	1 s	0.37	0.79
Melnick and Russell (1976)	Test anxiety	18	classical	4 s	0.18	0.37
Sapp Stanton (1992)	Test anxiety	40	classical	3 s	0.46	1.04
Stanton (1988)	Test anxiety	40	modern	ns	0.68	1.88
Stanton (1978)	Anxiety	40	classical	4 w	0.23	0.47
(D)						
Ashton et al. (1997)	Anxiety following bypass surgery	32	classical	5 days	0.09	0.18
Ashton et al. (1995)	Quality of life following bypass surgery	22	classical	1 w	0.12	0.23
Blankfield et al. (1995)	Care of bypass patients (surgery of breasts)	65	modern	2 w	0	0
Enqvist et al. (1997)	Postoperative vomiting	50	classical	6–8 days	0.59	1.46
nqvist et al. (1995)	Blood loss/blood pressure in maxillofacial surgery	36	classical	2 w (daily s)	0.27	0.56
Boutin and Tosi (1983)	Test anxiety	16	modern	6 w	0.46	1.05
Field (1974)	Preparation for surgery	60	classical	1 s	0.11	0.22
Freeman et al. (1986)	Analgesia in labour	65	classical	8 w	-0.09	-0.18
Gay et al. (2002)	Osteoarthritis pain	23	modern	8 w	0.41	0.90
Ghoneim et al. (2000)	Care of third molar surgery patients	60	undecidable	1 s	0	0
Ginandes and Rosenthal (1999)	Healing process of bone fractures	11	classical	ns	0.37	0.80
Gokli et al. (1994)	Local anesthesia	29	classical	1 s	0.27	0.55
Hart (1980)	Postoperative recovery (open heart surgery)	40	undecidable	2 days (5 s)	0.25	0.52
John and Parrino (1983)	Analgesia/reducing unnecessary movement in ophthalmic surgery	59	undecidable	1 s	0.30	0.62
Lambert (1996)	Improvement of postoperative course of children	50	modern	1 s	0.32	0.68

Lang et al. (2000)	Analgesia in interventional radiological procedures	161	classical	1 s	0.20	0.40
Lang et al. (1996)	Analgesia for invasive medical procedures	30	modern	1 s	0.44	0.99
Montgomery et al. (2002)	Distress/pain in breast biopsy patients	20	classical	1 s	0.41	0.90
Patterson et al. (1992)	Treatment of burn pain	20	classical	1 s	0.23	0.48
Wright and Drummond (2000)	Procedural pain during burn care	29	classical	2 s	0.31	0.64
(E)						
Jacknow et al. (1994)	Chemotherapy-related nausea/ vomiting in children	20	classical	ns	0.39	0.85
Katz et al. (1987)	Pain/distress in children undergoing bone marrow aspiration	36	classical	3 s	0.09	0.19
Kutner (1988)	Pain/distress/anxiety in children undergoing bone marrow aspiration	17	modern	2 s	0.13	0.26
Liossi and Hatira (1999)	Pain management in children undergoing bone marrow aspiration	20	classical	1 s	0.83	2.99
Syrjala et al. (1992)	Pain/nausea during cancer treatment	22	modern	3 w	0.06	0.12
Zeltzer et al. (1991)	Chemotherapy distress in children with cancer	38	classical	1 s	0.15	0.29

Table 3. Mean effect sizes for different fields of application

Field of application (categories A–E)	Number of studies	Number of patients *(completers in hypnosis and control)*	Mean weighted effect size
(A) Somatic complaints	17	582	r = 0.31** (d = 0.64)
(B) Smoking cessation	7	480	r = 0.28** (d = 0.59)
(C) Anxiety	8	315	r = 0.32** (d = 0.69)
(D) Support of medical procedures	19	881	r = 0.21** (d = 0.44)
(E) Hypnosis related to treatment of cancer	6	153	r = 0.28** (d = 0.59)

** $p < 0.001$

hypnosis-group and to one or more control groups which do not represent a neutral control condition according to our definition.

The average weighted effect size for all 133 studies (6006 patients in hypnosis and control group) amounts to d = 1.07 (r = 0.47). The analysis confirmed large differences between the mean effect sizes for the individual categories (see Table 4). The mean effect sizes range from d = 0.56 for studies with randomized design and effect sizes calculated on the basis of between-group comparisons up to d = 2.29 for those studies without randomization and pre-post comparisons as a basis for the calculation of effect sizes.

A weighted analysis of variance (Cooper and Hedges, 1994) with the factors 'randomization' ('randomized' vs 'non-randomized') and 'kind of comparison' ('pre-post comparison' vs 'between-group comparison') yielded significant effects for 'randomization' ($F_{1,128} = 11.27$; $p < 0.001$) and for 'kind of comparison' ($F_{1,128} = 9.41$; $p < 0.05$).

Relation between hypnotic suggestibility and treatment outcome

Only six randomized studies (from 57) with waiting control condition using validated measures of suggestibility reported numerical values for a correlation between suggestibility scores and outcome measures (for detailed information see Table 5). To evaluate a possible relation between hypnotic suggestibility and success of hypnotic treatment, we calculated the weighted mean correlation (Hunter et al., 1982) between these suggestibility scores and outcome measures which yielded a correlation of r = 0.44 ($p < 0.001$).

Table 4. Mean effect sizes dependent on study design

Study design	Weighted mean effect size	Number of studies	Number of patients *(completers in hypnosis group and control)*
Randomized	r = 0.29 (d = 0.61)	75	2823
Non-randomized	r = 0.60 (d = 1.51)	58	3183
Between-group comparison	r = 0.34 (d = 0.73)	79	4193
Pre-post comparison	r = 0.70 (d = 1.94)	54	1813
Randomized and between-group comparison	r = 0.27 (d = 0.56)	57	2411
Randomized and pre-post comparison	r = 0.42 (d = 0.93)	18	412
Non-randomized and between-group comparison	r = 0.44 (d = 0.98)	22	1782
Non-randomized and pre-post comparison	r = 0.75 (d = 2.29)	36	1401

Table 5. Studies reporting the relation between hypnotic suggestibility and treatment outcome

Author	Disorder/field of application	Test of suggestibility	Outcome measure	Correlation r	p
Galovski and Blanchard (1998)	Irritable bowel syndrome	SHSS:A	Symptom reduction	0.31	0.35
Liossi and Hatira (1999)	Pain management in children undergoing bone marrow aspiration	SHCS-Children	Pain reduction	0.69	<0.05
			Reduction of anxiety	0.63	<0.05
			Procedural stress	0.6	<0.05
Spanos et al. (1993)	Chronic headache	CURSS:O	Decrease in medication	0.16	ns
			Decrease in headache activity	0.29	ns
		CURSS:S	Decrease in medication	0.07	ns
			Decrease in headache activity	0.25	ns
		CURSS:OI	Decrease in medication	0.06	ns
			Decrease in headache activity	-0.05	ns
Spanos et al. (1988)	Warts	CURSS (vividness of imagery)	% wart loss	0.58	<0.01
		CURSS (vividness of sensations)	% wart loss	0.54	<0.05
Spanos et al. (1995)	Smoking cessation	CURSS	Reduction in cigarette consumption	0.16	ns
Wright and Drummond (2000)	Procedural pain during burn care	TAS	Reduction in pain (sensory)	0.66	<0.05
			Reduction in pain (affective)	0.64	<0.05

SHSS:A: Stanford Hypnotic Susceptibility Scale Form A (Weitzenhoffer and Hilgard, 1959)
SHCS-Children: Stanford Hypnotic Clinical Scale for Children (Morgan and Hilgard, 1978/1979)
CURSS: Carleton University Responsiveness to Suggestion Scale (O: objective; S: subjective; OI: objective-involuntariness) (Spanos et al., 1983)
TAS: Tellegen Absorption Scale (Tellegen and Atkinson, 1974)

Discussion

In our study that represents, as far as we know, the most extensive meta-analysis on the efficacy of hypnosis up to now, we exclusively included clinical studies and admitted only the comparison of patient-groups with a waiting control group. A medium efficacy of hypnosis (d = 0.63) for ICD-10 codable disorders and a low efficacy for the use of hypnosis in support of medical procedures (d = 0.44) was found.

Our estimates of the effect sizes for the use of hypnosis for medical interventions and ICD-10 codable disorders must be regarded as conservative since we used all dependent variables of a study for the computation of the mean study effect size. We have done so in order to meet the objection of having distorted the computation of the effect sizes by selection of variables. Regarding the use of hypnosis in support of medical procedures our way of proceeding surely led to an underestimation of the efficacy of hypnosis. In these studies, also those variables concerning the course of the somatic illness which scarcely can be influenced by hypnosis (e.g. duration of hospital stay) have been included in the computation of the effect sizes. This had an especially unfavourable effect when the control-group comprised patients that received the same medical treatment as the hypnosis-group.

When analyzing subgroups with respect to internal coherence (i.e. whether all the mean study effect sizes are estimates of a shared common population effect size) we found statistical homogeneity only for studies on the efficacy of hypnosis in support of medical interventions and anxiety. This means with regard to the whole field of application we are only able to make an integrated quantitative statement on the efficacy of hypnosis for those subgroups. An integrated quantitative statement on the efficacy of hypnosis for ICD-10 codable disorders is not yet possible. Presumably, the influence of moderator variables (e.g. kind of disorder, kind of measures used, etc.) has to be taken into consideration, which cannot be determined in more detail from the information being available.

As reported above, predominantly classical hypnosis is used in the studies of our analysis. About 70% of the studies could be assigned to the classical approach to hypnosis but only about 19% to modern hypnosis. Consequently, the results of our meta-analysis essentially refer to the practice of classical hypnosis.

In the introduction we emphasized that we intended to investigate the efficacy of hypnosis for a possibly wide scope of applications. But an overview of the fields of application that are covered by the studies of our meta-analysis (see Table 2) shows that the efficacy of hypnosis is not verified for a considerable part of the spectrum of psychotherapeutic practice. The consideration of the total meta-analytically utilizable literature shows that only few fields of application are represented in the clinical research on therapeutic efficacy of hypnosis (psychosomatic disorders, addiction, anxiety and support of medical procedures). But even those fields are covered only insufficiently by the studies of our analysis: in our meta-analysis, the spectrum of psychosomatic illnesses is only limited (essentially headache and bronchial asthma). The field of addictions is represented only by studies on smoking cessation. Regarding the hypnotic treatment of anxieties – with the exception of one study – exclusively studies on test anxiety are available. Affective and psychotic disorders as well as obsessive compulsive disorders or personality disorders are not all represented in our sample. The reason for this could be the relatively small number of studies that have been considered due to the chosen criteria for inclusion (randomization, waiting control group, clinical study).

But this restricted width of application of hypnosis in our study does not reflect the practice of the therapeutic use of hypnosis. There are reports on the use of hypnosis in schizophrenia or psychoses (Inhalainen and Rosberg, 1976; Murray-Jobsis, 1993), depressive symptoms (e.g. Gould and Krynicki, 1989), and in borderline disorders (Murray-Jobsis, 1993). Also, the hypnotherapeutic treatment of children with attention deficit disorders is reported (Calhoun and Bolton, 1986) as well as the use of hypnosis in the treatment of phobias (e.g. Marks, Gelder and Edwards, 1968; Ginsberg, 1993; Hammarstrand, Berggren and Hakeberg, 1995; Moore, Brodsgaard and Abrahamsen, 2002). The same can be stated for the treatment of patients with dissociative symptoms (Benningfield, 1992) or somatoforme disorders (Frederick and Phillips, 1992). Furthermore, studies and case reports can be found that describe the use of hypnosis in eating disorders (Gross, 1984; Vanderlinden and Vandereycken, 1990) and sexual dysfunction (e.g. Crasilneck, 1990; Aydin, Odabas, Ercan, Kara and Agargün, 1996; Aydin, Ercran, Cascurlu, Tasci, Karaman, Odabas, Yilmaz, Agargün, Kara and Sevin, 1997).

With regard to the use of hypnosis in daily practice, 210 psychotherapists with additional training in hypnotherapy (behavioural therapists, psychoanalytically working therapists, etc.) have been interviewed (Woitowitz, Peter and Revestorf, 1999). This survey reveals that psychotherapists use hypnosis also for treatment of depressions and personality disorders. Consequently, a gap between clinical research and therapeutic practice must be stated. Many psychological disorders being treated in practice are not represented in our meta-analysis. But even if the evidence must still seem insufficient, the partly high effect sizes of single studies indicate that it might be worthwhile to include non-represented fields of disorders in future clinical research on the efficacy of hypnosis and to conduct further efficacy studies in order to enlarge the spectrum of disorders for which clinical studies already are available. Investigations on the efficacy of hypnosis in comparison with other psychotherapeutic approaches have not yet been conducted. At least the meta-analysis of Kirsch et al. (1995) shows that the combination of cognitive behavioural therapy and hypnosis is clearly more effective than behavioural therapy without additional hypnotic treatment. A study on the treatment of obesity (Bolocofsky and Coulthard-Morris, 1985) showed a superiority of the combination of behavioural therapy and hypnosis even with a catamnesis of 24 months.

Since psychological treatment outcome may depend on either the kind of therapeutic intervention (specific effects) or on unspecific factors (e.g. therapeutic rapport; Grawe et al., 1994) we also intended to assess a possible correlation between suggestibility and treatment outcome. A substantial correlation between suggestibility scores and outcome variables would provide evidence for the existence of specific treatment effects due to hypnosis. We found a small to medium correlation ($r = 0.44$) but the small number of studies providing correlation coefficients (e.g. six from 57 studies) is not yet sufficient to confirm a relationship between hypnotic suggestibility and therapeutic outcome.

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Appendix

Transformation of test statistics

(a) t- value

$r = \sqrt{[t^2 / (t^2 + df)]}$

(b) F-value (two groups)

$t = \sqrt{F}$ (going on with (a))

(c) contingency tables

$r = \sqrt{[chi^2 / (chi^2 + N)]}$

(d) four cell frequencies

$r = phi = |AD - BC| / \sqrt{[(A + B)(C + D)(A + C)(B + D)]}$

(e) Mann-Whitney's U

$r = 1 - 2U / (N_1 N_2)$

(f) probability p

$p \rightarrow Z$ *(Z: corresponding z-value of standard normal distribution)*

$r = Z / \sqrt{N}$

Weighting of Fisher's Z-transformed effect sizes

$z_i(weighted) = w_i z_i$ *(z_i: Fisher's Z-transformed effect size)*

with $w_i = (n_i - 3) / \sum_{j=1}^{k} (n_j - 3)$ *(w_i: weight for effect size)* *(n: number of patients in sample)*

Weighting of effect size d

$d_i(weighted) = w_i d_i$

with $w_i = 1 / var(d_i)$

and $var(d_i) = ((n_1 + n_2) / n_1 n_2 + d_i^2 / 2 (n_1 + n_2 - 2))((n_1 + n_2) / (n_1 + n_2 - 2)$

Conversion of effect size d

$r = d / \sqrt{[d^2 + 4]}$

Conversion of effect size r

$d = 2r/\sqrt{1 - r^2}$

Address for correspondence:
Prof. Dr Walter Bongartz
Universität Konstanz
Math.-Naturwiss. Sektion
Fachbereich Psychologie
78457 Konstanz, Germany
Email: walter.bongartz@uni-konstanz.de