

This article was downloaded by: [62.30.95.249]

On: 09 October 2013, At: 04:51

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Effective Education

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/refe20>

A systematic review and meta-analysis of randomised controlled trials evaluating the effect of hypnosis on exam anxiety

Jennifer Baker ^a, Hannah Ainsworth ^b, Carole Torgerson ^b & David Torgerson ^c

^a Department of Psychology, University of York, York, UK

^b Institute for Effective Education, University of York, York, UK

^c York Trials Unit, Department of Health Sciences, University of York, York, UK

Published online: 06 Aug 2009.

To cite this article: Jennifer Baker, Hannah Ainsworth, Carole Torgerson & David Torgerson (2009) A systematic review and meta-analysis of randomised controlled trials evaluating the effect of hypnosis on exam anxiety, *Effective Education*, 1:1, 27-41, DOI: [10.1080/19415530903043664](https://doi.org/10.1080/19415530903043664)

To link to this article: <http://dx.doi.org/10.1080/19415530903043664>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms &

A systematic review and meta-analysis of randomised controlled trials evaluating the effect of hypnosis on exam anxiety

Jennifer Baker^a, Hannah Ainsworth^{b*}, Carole Torgerson^b and David Torgerson^c

^a*Department of Psychology, University of York, York, UK;* ^b*Institute for Effective Education, University of York, York, UK;* ^c*York Trials Unit, Department of Health Sciences, University of York, York, UK*

(Received 14 October 2008; final version received 6 April 2009)

Exam anxiety affects many students and may lead them to underperform. Hypnosis has been hypothesised as a method of reducing exam anxiety. A systematic review of randomised controlled trials (RCTs) was undertaken to assess whether or not hypnosis reduces exam-related anxiety. Five electronic databases were searched: ERIC; AMED; PsychInfo; Web of Science; MedLine until October 2007. Five small RCTs of variable but moderate quality were identified. The trials were undertaken largely among undergraduate healthcare students (e.g., medical and nursing students). The trials were combined in a fixed-effect meta-analysis and there was a statistically significant reduction in anxiety scores (mean effect size = -0.39 ; 95% CI -0.662 to -0.116 ; $p = 0.0053$). In conclusion, five relatively small RCTs of hypnotherapy were found; when they were combined in a meta-analysis there was a suggestion of a beneficial effect. Larger, more rigorous, trials of hypnotherapy with exam scores as an outcome are required.

Keywords: hypnotherapy; exam; anxiety; randomised controlled trial; meta-analyses; systematic review

Background

Drawing on the work of Spielberger (1972a, 1972b), Schwarzer and Jerusalem (1989) stated that 'Anxiety has been defined as an unpleasant emotional state or condition characterised not only by subjective feelings of tension, apprehension, nervousness, and worry, but also by activation or arousal of the autonomic nervous system' (Schwarzer & Jerusalem, 1989, p. 65).

Anxiety can be triggered by a number of factors. A commonly anticipated event that often leads to anxiety is exams; people suffering badly from exam anxiety can experience nausea, panic attacks, inability to sleep and often an inability to perform in the exam, which is caused by the release of adrenaline (Kring, Davison, Neale, & Johnson, 2007). Spielberger, Anton and Bedell (1976) defined 'test anxiety' (hereafter the term 'exam anxiety' is used) as a situation-specific anxiety trait (Spielberger et al. 1976). As Zeidner (1998) explained this refers to 'the individual's disposition to react with extensive worry, intrusive thoughts, mental disorganisation, tension, and physiological arousal when exposed to evaluative situations' (Zeidner, 1998, p. 18).

*Corresponding author. Email: hrp500@york.ac.uk

Sarason (1972) noted that correlation investigations have shown that high scorers on measures of exam anxiety tend to perform relatively poorly on various types of ability tests compared with low scorers. However, he also noted that experimental studies have suggested strongly that highly anxious persons are not less academically able; rather the problem appears to be that they exaggerate and personalise the threat of evaluation in a given situation (Sarason, 1972, p. 382). Students, therefore, who have the ability to perform well in exams, can perform poorly because of the debilitating effects of anxiety. Zeidner (1998) argued that exam anxiety 'results in crucial real-life consequences for many examinees' and 'the loss to society of the full contribution of potentially capable students through anxiety-related underachievement and/or academic failure constitutes an important mental health problem in education' (Zeidner, 1998, p. 5). Exam anxiety appears to be fairly widespread and with the increasing number of exams in the UK and the USA, and the importance placed on exams for education and career progression, it has become increasingly important to find ways to reduce the debilitating effects of exam anxiety (Zeidner, 1998, p. 6). One method of reducing exam anxiety is through the use of relaxation techniques, in particular hypnosis.

Hypnosis, defined as a 'sleep like state in which the mind responds to external suggestion and can recover forgotten memories' (*The Chambers Dictionary* (10th ed.), 2006, pp. 732–733) has been widely used to help people overcome a variety of problems such as tobacco addiction (Elkins & Rajab, 2004), weight loss (Stradling, Roberts, Wilson, & Lovelock, 1998) and chronic pain (Elkins, Jensen, & Patterson, 2007). It was first properly recognised in the eighteenth century when Franz Anton Mesmer (1734–1815) practised it to help people overcome hysterical problems (Crawford & Gruzelier, 1992). Sapp (1990) noted that there are two major features of hypnosis: the first is a cognitive component; and the second is a relaxation component. It is a combination of these two components that may make hypnosis effective in reducing exam anxiety. Whitehouse et al. (1996) explained that 'academic examinations increase levels of anxiety and emotional distress, and promote diverse endocrine alterations' (Whitehouse et al. 1996, p. 249). It has been suggested that relaxation procedures may reduce exam-related increases in self-reported distress symptoms and that relaxation procedures have also been associated with immunologic changes in other investigations (Whitehouse et al. 1996, p. 250). Hypnosis is a traditional relaxation procedure, which can be conducted in many ways, but usually begins with eye fixation, suggestions of calmness and relaxation and the closing of the eyes. It is then followed with imagery associated with deep relaxation, rather like a dream (Gruzelier, 1998). Hypnotherapy is often used as a treatment for more severe forms of anxiety, such as acute stress disorder (Bryant, Moulds, Guthrie, & Nixon, 2005) and posttraumatic stress disorder (Solomon & Johnson, 2002). Since some of the symptoms of these disorders are similar to, if more severe than, those experienced by people suffering from exam anxiety, hypnotherapy has been proposed as a possible intervention for exam anxiety.

Some randomised controlled trials (Sapp, 1990; Whitehouse et al., 1996) have been conducted looking at the effectiveness of hypnotherapy in reducing exam anxiety; however, as far as we are aware there have been no systematic reviews addressing this question. This systematic review and meta-analysis aimed to fill this gap in the research literature and help to provide further evidence of the effect of hypnotherapy on exam anxiety.

Methods

A protocol for this systematic review was developed before the research was undertaken (see Appendix 1).

Searching procedures

In October 2007, five bibliographic databases were electronically searched, using a detailed search strategy (see Appendix 2) developed to identify potentially relevant papers for inclusion in the review. All of the searches (except the search of Web of Science) were conducted by an experienced Information Officer and began at the start date available for each database (see Table 1). In an attempt to identify any grey literature the ERIC database was searched, which contains unpublished reports and dissertations.

Study selection

Detailed content-based and methodological inclusion and exclusion criteria were developed. To be included in the review the paper had to report a RCT examining the effect of hypnotherapy on exam anxiety. As RCTs are not systematically key-worded in the databases, a sensitive but not very specific search strategy was adopted: this maximised the chance of identifying relevant studies but increased the number of irrelevant hits.

Inclusion criteria

To be included in the review studies had to:

- examine the effect of hypnotherapy on test anxiety;
- use a randomised controlled trial design (the best design for answering questions of effectiveness);
- include a control group receiving usual care or no intervention;
- include at least 10 participants (an arbitrary cut-off, justified by the likelihood of smaller trials being too small to detect any effects of hypnotherapy. Also, excluding very small studies can reduce the possibility of publication bias, which occurs when small studies with exceptionally positive results get published but those with null or negative results do not);
- use anxiety scales to measure outcomes.

Screening procedures

At stage one of the screening procedures the titles and abstracts of all papers identified during the searching were independently double screened by two reviewers (HA

Table 1. Search strategy details.

Database searched	From (date)
The Educational Research Information Clearinghouse (ERIC)	1966
PsycINFO	1806
Ovid Medline	1950
Allied and Complementary Medicine (AMED)	1985
Web of Science (Science and Social Sciences)	1900

and JB) using the inclusion criteria specified previously and any discrepancies were discussed and resolved. Where it was not possible for the two reviewers to come to an agreement about a study, a third reviewer (DT) looked at the title and abstract and a discussion was held until all reviewers were in agreement. To quality assure these screening procedures a fourth reviewer (CT) checked a random sample of 25% of the titles and abstracts. The full papers for any potentially relevant studies were retrieved. At stage two of the screening procedures the full papers were independently double screened for inclusion in the review by two reviewers (HA and JB) and any differences resolved. Again where differences could not be resolved a third reviewer (DT) looked at the full paper and a discussion was held until all reviewers were in agreement.

Data extraction of included studies

Data about the participants in the trials, the intervention and the outcomes were extracted from all included papers using a standard format (see Appendix 3). Data extraction was conducted independently by two reviewers (HA and JB), who then discussed and resolved any differences in data extraction. Where it was not possible for the two reviewers to come to an agreement a third reviewer (DT) looked at the full paper and a discussion was held until all reviewers were in agreement about the data to be extracted from the study.

Quality appraisal of included studies

All of the included studies were independently quality appraised by three reviewers (HA, DT and CT) using an adapted version of the CONSORT statement (Moher, Shultz, & Altman, 2001). If there was any disagreement between the reviewers a discussion was held until all reviewers were in agreement.

Data analysis

A meta-analysis, pooling the results from the five included RCTs was conducted. The anxiety scales used to measure outcomes in the five RCTs were not all the same, consequently we calculated a standardised effect size to summarise the differences between the randomised groups within individual trials. The standardised effect size was calculated by finding the difference between the means in the groups and dividing this by a pooled standard deviation of the intervention and control groups. A standardised effect size around zero suggests little or no effect of the intervention, a positive effect size suggests that the intervention increased anxiety levels and a negative effect size suggests that the intervention decreased anxiety levels.

For each standardised effect size a 95% confidence interval (CI) was calculated to show how precise the size of effect was likely to be. The average standardised effect size of the five included RCTs was then calculated using a fixed-effect model because there was no evidence of heterogeneity in terms of the populations, interventions and outcomes in the included studies, to produce an overall pooled effect size (with 95% CI). A CI that includes zero suggests an effect is not statistically significant at the 5% level. The computer software package Arcus Quickstat was used to calculate the pooled effect size.

Results

Included studies and quality assurance procedures

The searches of the electronic databases generated 176 potentially relevant titles. After screening the titles and abstracts the full papers for 13 studies were retrieved. On closer inspection of the 13 papers retrieved, 5 were found to meet all the inclusion criteria. All of the studies reported a RCT that had been individually randomised. The Quality of Reporting of Meta-analyses (QUOROM) flowchart (Moher et al., 1999) (see Figure 1) details the reasons for exclusion of the eight excluded studies. Agreement between the two main reviewers and the third and fourth reviewers was 100% at both stages of screening for inclusion. Agreement on the data extraction was high and simple differences in the data extraction sheets, such as different comments recorded, were discussed and resolved with the help of a third reviewer. Agreement between the reviewers on the Consolidated Standards of Reporting Trials (CONSORT) quality items judgements was high.

Table 2 provides details of the five included studies, including information about settings and participants, interventions, control groups and outcome measures.

In one paper the standard deviation was not mentioned; instead the standard error of the mean was reported (Kiecolt-Glaser, Marucha, Atkinson, & Glaser, 2001), so we converted the scores back into standard deviations.

In the study by Gruzelier, Smith, Nagy and Henderson (2001) the results for the hypnosis group had been reported in two parts, one set of results for participants who were highly susceptible to hypnosis and one set of results for participants who had low susceptibility. In this case the data were pooled to create a set of results representing the hypnosis group as a whole.

Table 3 presents the main results for each trial, showing the standardised effect size difference between intervention and control together with the associated confidence interval.

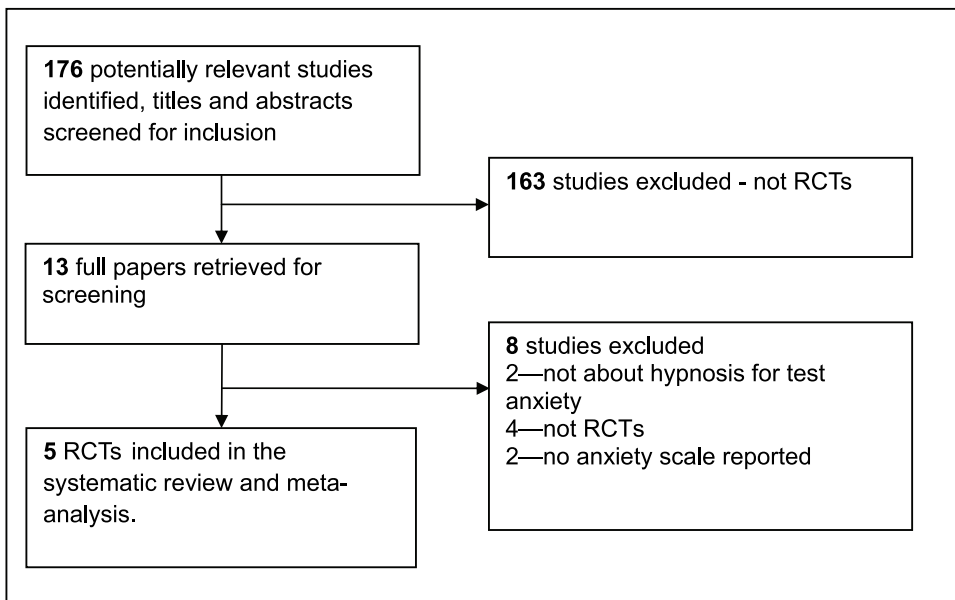


Figure 1. QUOROM flowchart.

Table 2. Description of the included randomised controlled trials.

Study reference	Study setting	Intervention	Control	Outcome measures
Boutin and Tosi (1983)	American female nursing students with a mean age of 20 years.	Hypnotic induction administered to Ps. Ps told that hypnosis leads to relaxation, which is antagonistic to anxiety.	Ps received no treatment	Test Anxiety Scale (TAS)
Sapp (1990)	American psychology students with a mean age of 19 years.	Each P received four hypnosis sessions over a four-week period emphasising that the Ps will be prepared for the exams. Scripts used to standardise the hypnotic process.	Ps received no treatment but study behaviour was monitored during the four-week period the intervention group received their hypnosis.	Test Anxiety Inventory (TAI)
Whitehouse et al. (1996)	American medical students with a mean age of 24.5 years.	90 min hypnosis sessions carried out once a week throughout the semester (14 sessions). Ps encouraged to engage in self-hypnosis for 15 minutes a day. Also completed daily diaries.	Ps received no hypnosis, but were offered it in the following semester. Also filled out daily diaries.	Anxiety scale of the Brief Symptom Inventory (BSI)
Gruzelier et al. (2001)	British medical students with a mean age of 20.1 years.	Ps attended one hypnosis session and were given a tape to do their own sessions three times a week for three weeks. Asked to keep diaries and were phoned to check for compliance.	Ps received no treatment.	State Anxiety Scale (Spielberger et al., 1970)
Kiecolt-Glaser et al. (2001)	American medical and dental students with a mean age of 23.5 years.	Ps attended five hypnosis sessions (standardised with a written manual) which lasted 25–40 minutes. Asked to rate their relaxation before and after the session to determine effectiveness of the treatment.	Ps received no treatment, but were offered it after the trial.	Perceived Stress Scale (PSS)

Table 3. Summary of results of the included randomised controlled trials.

Study reference	Group sample size		Mean post-test anxiety score		SD		Standardised effect size	95% confidence interval	Reduces anxiety?
	Intervention	Control	Intervention	Control	Intervention	Control			
Boutin and Tosi (1983)	12	12	18.54	25.42	6.2	6.1	-1.08	-1.94 to -0.22	yes*
Sapp (1990)	44	50	51.5	53.18	5.51	7.25	-0.257	-0.66 to 0.15	yes
Whitehouse et al. (1996)	21	14	57	63	10.43	10.43	-0.609	-1.30 to 0.08	yes
Gruzelier et al. (2001)	16	12	44.82	47	13.83	10.44	-0.169	-0.92 to 0.58	yes
Kiecolt-Glaser et al. (2001)	17	16	13.53	15.69	7.05	7.56	-0.289	-0.97 to 0.40	yes

*Note: Statistically significant

The effect sizes of all five trials were negative, suggesting that hypnosis was effective in reducing test anxiety; however the effect size was only statistically significant in one of the studies (Boutin & Tosi, 1983).

Quality of the included studies

All of the studies were of high quality in the sense that they all used the RCT methodology. This is the best method for answering questions of effectiveness (Torgerson & Torgerson 2008). However, RCTs can be of varying quality and low quality studies can be a source of bias in the results. It is therefore important for us to consider other marks of quality. Generally, the studies had small sample sizes. None of the included studies provided a justification for the sample size or presented a sample size calculation. While it was clear that all of the studies were individually randomised, it was not clear from any of the papers what process was used to generate the allocation sequence and consequently whether or not this was adequate. It was also unclear whether the randomisation procedure was concealed from researchers recruiting participants into the trials. The outcome of interest for the purpose of this systematic review was participants' scores on an anxiety scale. Because most of these scales are self-reported it would not have been possible for the scales to have been completed blind to allocation. The anxiety scales could, however, have been scored blind to group allocation; it was not clear in any of the papers whether this was done. It was not stated in four of the papers whether intention to treat analysis had been conducted. In one paper (Sapp 1990) the attrition rate was reported, and it appears that intention to treat analysis was *not* conducted in this study. None of the included studies presented effect sizes with confidence intervals. All of the studies did, however, present means and standard deviations (except one paper where the standard error of the mean was reported (Kiecolt-Glaser, Marucha, Atkinson, & Glaser, 2001)). All of the studies reported *p*-values.

The results of the five included trials were pooled using a fixed-effect model because there was no evidence of heterogeneity (Figure 2). The overall effect size suggests that hypnosis was effective in reducing test anxiety. The difference was significant at the 5% level (standardised effect size -0.39 ; 95% CI -0.662 to -0.116 ; $p = 0.0053$). A standardised effect size difference of -0.39 equates to about a 3-point reduction on the State Anxiety Scale (Spielberger, Gorsuch, & Lushene 1970), in which scores range from 20 to 80, if a standard deviation of 7 is assumed, or an approximate 5-point reduction if the standard deviation were 12.

We did not conduct any subgroup analyses because of the limited number of studies included in the review. Also, because we did not search specifically for studies comparing hypnotherapy with alternative interventions, such as methods of relaxation, we did not conduct an analysis looking at the difference between hypnotherapy and alternative interventions.

Evidence for heterogeneity

To be able to pool studies in a valid way, studies must be relatively homogeneous in terms of the intervention and the populations under study. In this review we felt it was appropriate to pool the results of the included studies. All the studies had similar participants: undergraduate students of a similar age and background (in four studies participants were medical or nursing students). The intervention was more varied,

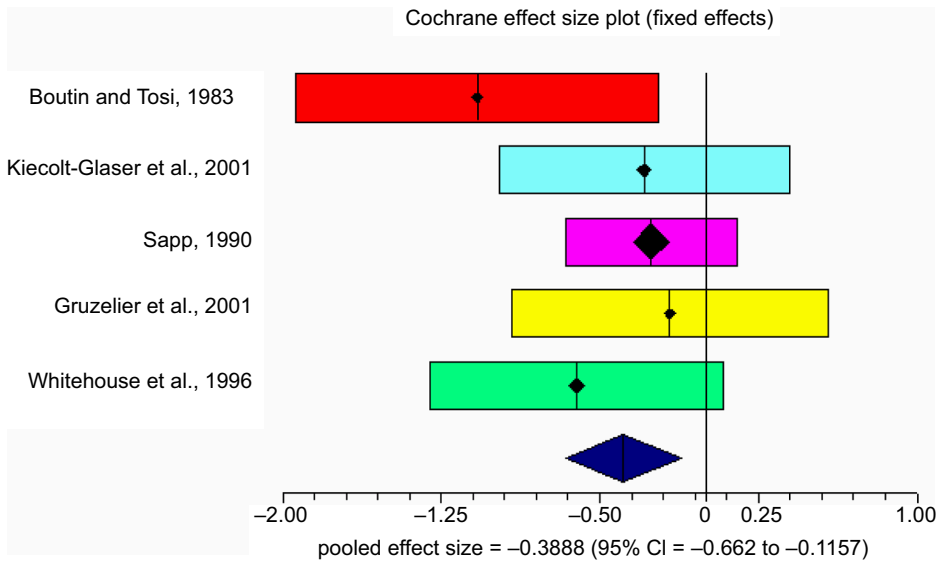


Figure 2. Standardised effect sizes and 95% confidence intervals of the five included randomised controlled trials.

Note: The size of the black diamonds in each rectangle are proportional to the sample size (i.e., the larger the diamond, the bigger the sample size). The diamond at the bottom of the chart represents the summary pooled estimate of all the trials and the summary estimate of the 95% confidence intervals.

with the dose of hypnosis being slightly different in the studies; however, the studies were judged to be sufficiently similar to allow pooling. Finally, statistically, there was no evidence of heterogeneity between the five studies (The Q statistic which provides a measure of heterogeneity was calculated as 3.71; $p = 0.447$), so comparing the studies in the meta-analysis was likely to be valid.

Publication bias

An exploratory funnel plot was undertaken and visual examination suggested little evidence of asymmetry and consequently little evidence for publication bias. However, due to the small number of trials included in the meta-analysis the results of such a funnel plot are limited and so the funnel plot has not been provided here.

Discussion

The research literature suggests that exam anxiety is a widespread problem that affects students' abilities to perform to their potential under examination conditions. The effects of exam anxiety are detrimental not only for the individual student concerned but also for society at large. The past few decades have seen students faced with an increasing number of exams and mounting importance placed on exam results for future education and career progression both in the UK and in other countries such as the USA. This has made research into the problem of exam anxiety and how to reduce its detrimental effects even more vital. Hypnosis has been suggested as one possible way of reducing exam anxiety.

This systematic review systematically searched for all the RCTs that had been conducted looking at the effect of hypnosis on exam anxiety. The results of the meta-analysis suggested that hypnosis is moderately effective in reducing exam anxiety. The overall standardised effect size of the five trials was -0.39 which was statistically significant to the 5% level. This is a very important result since, as discussed previously, finding ways to reduce the impact of exam anxiety is needed. The pooled effect size is a substantial effect size for an educational intervention and in view of the impact of the problem any reduction in exam anxiety would appear to be a positive outcome. However, the included trials were of variable quality, and all had limitations in their design which could have introduced sources of bias into the individual trials. The promising result of the review should, therefore, be interpreted with caution.

We must also highlight a number of other limitations of this systematic review and we would argue that further, rigorous, well-conducted research into the effect of hypnosis on exam anxiety is vitally needed.

Firstly, it should be noted that while we believed the studies to be sufficiently similar to pool in a meta-analysis there were some differences between the studies.

In regard to the intervention, the time period over which the intervention was delivered and the way that the hypnosis was delivered were different in all the studies. For example, Kiecolt-Glaser et al. (2001) had five hypnosis sessions within eight days but Whitehouse et al. (1996) had one hypnosis session a week for 14 weeks. Two of the studies used a hypnosis script (Kiecolt-Glaser et al., 2001; Sapp, 1990), so it was easy to see exactly how the hypnotherapy was delivered in these studies, but it was less clear in the remaining three studies. All of the studies suggested self-hypnosis should be conducted at home; however, it is unknown exactly how much self-hypnosis people would do at home, if any at all. There is also the problem that people conducting self-hypnosis might not be doing it correctly. Gruzelier et al. (2001) suggested that a few of the participants' own sessions should be watched for quality control. This review does not therefore provide us with evidence on the optimum 'dose' of hypnotherapy or the method of delivery.

While all of the studies were conducted on similar participants (college-age students) the studies took different approaches to which students they included in the trial in respect to participants' susceptibility to hypnosis. Two of the studies split their participants into high and low hypnotic susceptibility (Boutin & Tosi, 1983; Gruzelier et al., 2001) but Sapp (1990) did not measure hypnotic susceptibility at all. Whitehouse et al. (1996) measured hypnotic susceptibility but did not use it to split the groups and Kiecolt-Glaser et al. (2001) only included participants who scored 7 or higher on the Harvard Group Scale of Hypnotic Susceptibility. Some trial results are therefore generalisable to students of all hypnotic susceptibility, whereas others such as in the Kiecolt-Glaser et al. (2001) study are only generalisable to those with high hypnotic susceptibility. We could not conduct a subgroup analysis to look at any differences between high and low susceptibility to hypnosis, because only two of the studies provided these data.

Five RCTs which studied the effect of hypnosis on exam anxiety were included in the review, suggesting that there has been some rigorous experimental research in this area; however, more is needed to support and strengthen the existing research. Of the five included trials only one had been conducted in a UK setting, (Gruzelier et al., 2001); the others were all conducted in the USA. We must, therefore, be careful in generalising these results to the UK setting. The review also highlights the need for a well-conducted RCT assessing the effect of hypnosis on exam anxiety to be

conducted in the UK. If further research is to be conducted the following points are worth considering.

Firstly in any future research the hypnotic susceptibility of participants should be measured. Gruzelier (1998) suggested that participants should be split into groups of high, medium and low susceptibility to hypnosis, as the effects of hypnosis on exam anxiety appear to depend on how susceptible you are to it. The reason for this is, presumably, because hypnosis is likely to be more effective among susceptible students than non-susceptible students. Consequently, without some measure of susceptibility the effectiveness of hypnotherapy may be underestimated among those who are highly susceptible to hypnosis. By measuring and recording susceptibility to hypnosis, the effects of hypnosis on exam anxiety for different groups would be clarified and the characteristics of students who would benefit most from hypnotherapy would be identified.

Secondly, in the study conducted by Boutin and Tosi (1983), rational stage directed hypnotherapy (RSDH), which is a therapy involving imagery, cognitive behaviour therapy or rational emotive therapy and hypnotherapy, was found to be more effective at reducing test anxiety than the hypnosis only condition and the positive changes were maintained longer in the follow-up period. Both the hypnosis group and the RSDH group also significantly improved their exam scores, but the group receiving RSDH improved significantly more than hypnosis only group. Perhaps more studies into the effects of RSDH as well as hypnosis need to be conducted to explore the difference in effects between these two conditions.

Thirdly, more studies need to be conducted which experiment with the optimum 'dose' of hypnotherapy and investigate whether there is a difference in outcome between those taught to self-hypnotise and those to whom hypnotherapy it delivered by a trained individual.

Fourthly, and perhaps most importantly, if further research is to be conducted in this area then it is imperative that the effect of hypnosis on exam performance is also measured as a primary outcome. The effect of hypnosis on exam performance is the crucial factor. Hypnosis may reduce exam anxiety but if it does not improve exam performance then its impact is limited. Only two of the studies looked at improvement in exam performance (Boutin & Tosi, 1983; Sapp, 1990), but both these studies suggested that exam scores were improved by the hypnosis intervention. Another reason for investigating the impact on exam performance is to determine the ideal level of anxiety needed to perform well academically, as not having enough anxiety could be detrimental to academic performance.

Overall, this systematic review provides evidence to suggest that hypnosis is effective in reducing exam anxiety. However, further experimental research is needed to support this conclusion. It is recommended that such further research should focus on the effects of hypnosis on exam performance.

Acknowledgements

This systematic review and meta-analysis was conducted as part of Jennifer Baker's BSc in psychology. None of the authors are connected in any way to any of the trials included in the review.

References

- Boutin, G.E., & Tosi, D.J. (1983). Modification of irrational ideas and test anxiety through rational stage directed hypnotherapy (RSDH). *Journal of Clinical Psychology*, 39, 382–391.

- Bryant, R.A., Moulds, M.L., Guthrie, R.M., & Nixon, R.D.V. (2005). The additive benefit of hypnosis and cognitive-behavioural therapy in treating acute stress disorder. *Journal of Consulting and Clinical Psychology*, 73, 334–340.
- The Chambers Dictionary* (10th ed.) (2006). Edinburgh: Chambers Harrap Publishers Ltd.
- Crawford, H.J., & Gruzelier, J.A. (1992). A midstream view of the neurophysiology of hypnosis: Recent research and future directions. In W. Fromm & M. Nash (Eds), *Hypnosis: Research developments and perspectives* (3rd ed., pp. 227–266). New York: Guilford Press.
- Elkins, G.R., Jenson, M.P., & Patterson, D.R. (2007). Hypnotherapy for the management of chronic pain. *International Journal of Clinical and Experimental Hypnosis*, 55(3), 275–587.
- Elkins, G.R., & Rajab, M.H. (2004). Clinical hypnosis for smoking cessation: Preliminary results of a three-session intervention. *International Journal of Clinical and Experimental Hypnosis*, 52(1), 73–81.
- Gruzelier, J.A. (1998). A working model of the neurophysiology of hypnosis: A review of evidence. *Contemporary Hypnosis*, 15, 3–21.
- Gruzelier, J.A., Smith, F., Nagy, A., & Henderson, D.C. (2001). Cellular and humoral immunity, mood and exam stress: The influences of self-hypnosis and personality predictors. *International Journal of Psychophysiology*, 42, 55–71.
- Kiecolt-Glaser, J.K., Marucha, P.T., Atkinson, C., & Glaser, R. (2001). Hypnosis as a modulator of cellular immune dysregulation during acute distress. *Journal of Consulting and Clinical Psychology*, 69, 674–682.
- Kring, A.M., Davison, G.C., Neale, J.M., & Johnson, S.L. (2007). *Abnormal psychology* (10th ed.). Hoboken, NJ: John and Wiley & Sons.
- Moher, D., Cook, D.J., Eastwood, S., Olkin, I., Rennie, D., Stroup, D.F., et al. (1999). Improving the quality of reports of meta-analyses of randomised controlled trials: The QUOROM statement. *The Lancet*, 354, 1896–1900.
- Moher, D., Shultz, K.F., & Altman, D. (2001) The CONSORT statement: Revised recommendations for improving the quality of reports of parallel-group randomised trials. *JAMA*, 285(15), 1987–1991
- Sapp, M. (1990, August). *Hypnotherapy and test anxiety: Two cognitive-behavioural constructs. The effects of hypnosis in reducing test anxiety and improving academic achievement in college students*. Paper presented at the 98th annual Convention of the American Psychological Association, Boston, USA.
- Sarason, I.G. (1972). Experimental approaches to test anxiety: Attention and the uses of information. In C.D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (Vol. 2, pp. 283–400). New York: Academic Press.
- Schwarzer, R., & Jerusalem, M. (1989). Development of test anxiety in high school students. In C.D. Spielberger, I.G. Sarason & J. Strelau (Eds.), *Stress and anxiety* (Vol. 12, pp. 65–79). New York: Hemisphere Publishing Corporation.
- Solomon, S.D., & Johnson, D.M. (2002). Psychosocial treatment of post-traumatic stress disorder. *Journal of Clinical Psychology*, 73, 334–340.
- Spielberger, C.D. (1972a). Anxiety as an emotional state. In C.D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (Vol. 1, pp. 23–49). New York: Academic Press.
- Spielberger, C.D. (1972b). Conceptual and methodological issues in anxiety research. In C.D. Spielberger (Ed.), *Anxiety: Current trends in theory and research* (Vol. 2, pp. 481–493). New York: Academic Press.
- Spielberger, C.D., Anton, W.D., & Bedell, J. (1976). The nature and treatment of test anxiety. In M. Zuckerman & C.D. Spielberger (Eds.), *Emotions and anxiety: New concepts, methods, and applications* (pp. 317–344). Hillsdale, NJ: Erlbaum.
- Spielberger, C.D., Gorsuch, R.L., Lushene, R.D. (1970) *STAI manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Stradling, J., Roberts, D., Wilson, A., & Lovelock, F. (1998). Controlled trial of hypnotherapy for weight loss in patients with obstructive sleep apnoea. *International Journal of Obesity*, 22(3), 278–281.
- Torgerson, D.J., & Torgerson, C.J. (2008) *Designing randomised controlled trials in health, education and the social sciences: An introduction*. Basingstoke, UK and New York, NY: Palgrave Macmillan.

- Whitehouse, W.G., Dinges, D.F., E.C.O., Keller, S.E., Bates, B.L., Bauer, N.K., et al. (1996). Psychosocial and immune effects of self-hypnosis training for stress management throughout the first semester of medical school. *Psychosomatic Medicine*, 58, 249–263.
- Zeidner, M. (1998). *Test anxiety: The state of the art*. Hingham, MA: Kluwer Academic Publishers.

Appendix 1. Protocol

What is the title?

A systematic review and meta-analysis of randomised controlled trials evaluating the effect of hypnosis on exam anxiety.

What is the context and what are the conceptual issues?

It is known that exams cause stress, and it has been suggested that stress is bad for your health. So methods for reducing exam stress need to be found, especially as most people taking exams are young (i.e. at school or university). It has been suggested that hypnosis is effective in reducing stress, so perhaps hypnotherapy sessions could also be successful in reducing exam stress. Another issue is whether reduction in stress leads to improved grades, as it could be the stress that makes the pupils do well.

Has a scoping review been undertaken? If yes what were the results?

A review of the literature has not yet been undertaken.

What is the aim?

The aim of this review is to help fill the gap in the knowledge base of the effects of hypnosis on exam anxiety/stress, and to suggest implications.

What is the research question?

Is hypnosis effective in reducing exam anxiety/stress?

What is the search strategy?

Electronic search of a number of psychological and educational databases.

What are the inclusion/exclusion criteria?

- Topic: exam stress and hypnotherapy
- RCTs
- At least 10 participants per trial
- Anxiety scale as a measurement of stress
- Control – no intervention

How will the data be extracted and analysed?

Double data extraction from all the included papers. Included studies will be tabulated and effect sizes calculated. Perhaps then conduct meta-analysis if two or more of the trials are similar enough.

Explore potential publication bias with funnel plots.

How will the quality of studies be assessed?

RCTs, validity, biases

Appendix 2. Search strategies

ERIC 1996 to October 2007

1. Hypnosis.W.DE
2. hypnotherapy
3. 1 OR 2
4. random\$
5. trial\$
6. evaluat\$
7. 4 OR 5 OR 6
8. 3 AND 7

PsycINFO 1806 to October 2007

- #1. exp hypnosis/ or exp hypnotherapy/
- #2. limit 1 to "2000 treatment outcome/randomized clinical trial"

Ovid MEDLINE (R) 1950 to October 2007

- #1 exp Hypnosis/
- #2 hypnotherapy.mp.
- #3 1 or 2
- #4 "randomized controlled trial [publication type]"/
- #5 exp Randomized Controlled Trials/
- #6 4 or 5
- #7 3 and 6
- #8 Stress, Psychological/
- #9 Anxiety/
- #10 8 or 9
- #11 7 and 10

AMED (Allied and Complementary Medicine) 1985 to October 2007

- #1 Hypnosis
- #2 hypnotherapy.mp.
- #3 1 or 2
- #4 Randomized controlled trials/
- #5 3 or 4

ISI Web of knowledge

Databases searched:

Science Citation Index Expanded (SCI-EXPANDED) 1900 to 2007

**Social Sciences Citation Index (SSCI) 1956 to 2007
Arts and Humanities Citation Index (A&HCI) 1981 to present**

#1 TS=hypnosis
#2 TS=hypnotherapy
#3 TS=Stress
#4 #2 OR #1
#5 #4 AND #3
#6 TS=exam*
#7 #6 AND #5

Appendix 3. Data extraction form

Author:
Title:
Year:
Country:
Publication type; full reference:
Setting:

Objective:

Study Topic:

Outcome Measures:

Design: (page ref and quotation)

Participants:

Intervention/s:

Control/s:

Results:

Summary:

Comments: