Clinical Applications of Self-Hypnosis: A Systematic Review and Meta-Analysis of Randomised Controlled Trials.

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Abstract

We conducted a systematic review of randomized control trials examining the efficacy of self- hypnosis as a clinical treatment. Searching for ‘self-hypnosis’, ‘self-hypnotic’, ‘autosuggestion’, and ‘autohypnosis’ returned 576 studies, of which 22 met the definition of being an RCT. Self-hypnosis has been reported to be efficacious in studies of pain, childbirth, paediatric applications, stress and anxiety. Methodological differences among studies are discussed. Self-hypnosis is most likely to be effective when taught as an independent self-directed skill and when it involves at least three practice sessions before participation in the trial. Experience of hetero-hypnosis does not seem to be essential in producing an effect for self-hypnosis. Studies reporting no effect typically involved participants listening to audio recordings of hetero-hypnosis only. Meta- analysis revealed a medium-to-large effect size for self-hypnosis in clinical treatment.

Self-hypnosis can be defined as self-induction into the hypnotic process produced by self- generated suggestions. Self-hypnosis can be distinguished from hetero-hypnosis in that the latter requires the presence of a hypnotist to guide thoughts and deliver suggestions in the context of hypnosis. While a large amount of empirical exploration has been devoted to hetero-hypnosis and its clinical applications, relatively scant attention has been devoted to the study of self-hypnosis. Orne and McConkey (1981) stated "Given the popularity and therapeutic potential of self- hypnosis, further research is desirable to establish a scientific data-base concerning its actual clinical use" (Orne & McConkey, 1981, pp. 314). The aim of the present work is to provide a systematic review of the clinical application of self-hypnosis. Studies have reported encouraging signs for the clinical applications of self-hypnosis. For example, research suggests that self-hypnosis can be effective in: overcoming a habit cough (Anbar & Hall, 2004); treating hemophilia (LaBaw, 1975); reducing tics in Tourette's syndrome (Lazarus & Klein, 2010); decreasing emotional distress in breast cancer patients (Bragard et al., 2016) and hot flashes among postmenopausal women (Elkins, Johnson, Fisher and Sliwinski, 2013); enhancing a therapeutic education program for children with chronic pain (Delivert, Dugue, Ferrari, Postone and Dahmani, 2018); advancing quality of life following coronary artery bypass surgery (Ashton et al., 1995); managing pain in female patients with multiple sclerosis (Hosseinzadegan, Radfar, Shafiee-Kandjani & Sheikh., 2016); raising pain threshold (Wolf and colleagues, 2016); reducing stress (Johansson & Unestål, 2006); influencing immune functioning (Gruzelier et al., 2001a; 2001b); treating depression in primary care (Dobbin, Maxwell & Elton, 2009); and improving reading comprehension and learning(Cooper, 1990; Wark, 1996; Wark & La Plant, 1991). However, when examining the literature on the efficacy of any clinical intervention it is the randomized control trial (RCT) that is considered the gold standard of scientific

evidence. Therefore, here we systematically review RCTs of the clinical applications of self-hypnosis.

Inclusion criteria

Our review focuses on studies conducted since James Braid (1841) inaugurated the modern era of hypnosis. Although self-hypnosis is sometimes referred to as *autohypnosis*, the two terms are synonymous. Emile Coué (1922), who coined the term "autosuggestion," did not directly refer to autosuggestion as self-hypnosis, but the two terms are considered similar by many authors. Nevertheless, Weitzenhoffer (2000) states that "Autosuggestion and self-hypnosis are not the same thing" (p. 380) and contends that it is improper for researchers to "lump autosuggestion under 'autohypnosis' when in fact there is little evidence that hypnosis is used at all.

However, the fact that the term autosuggestion has been used in this way by other authors as a label for self-hypnosis warrants it being used as a search term and examined, independently, in this review. Therefore, we conducted searches of the Cochrane Library, MEDLINE, PsycINFO, PubMed, and Scopus databases using the terms 'self-hypnosis', 'self-hypnotic', 'autosuggestion', and 'autohypnosis.' Only publications in English were considered. We selected RCTs in peer-reviewed journals in which self-hypnosis was applied to a clinical issue that one would typically seek treatment for, relief from, or assistance with in a clinical or medical setting, or for which one might seek therapeutic assistance. Studies comparing self- hypnosis against a no treatment control condition were excluded. With the focus being on clinical applications of self-hypnosis, we focus on studies comparing self-hypnosis to other clinical applications. As control conditions we included waiting list control, standard care, conventional treatment, and any other active or psychological therapy (e.g., biofeedback, cognitive-behavioral therapy,

psychodynamic therapy, mindfulness, and relaxation therapy). Our search strategy yielded 576 records, and after excluding 58 duplicates, only 22 met the definition of an RCT and were included. Although two studies were omitted due to a failure to explicitly detail the methodology employed, most that were excluded were not RCTs. See Table 1 for a list of the 22 randomized controlled trials reviewed. While we have attempted to be comprehensive in our coverage of the literature, relevant studies might have been overlooked. Nevertheless, we hope we have included enough key studies to provide the basis for a comprehensive investigation of the subject and consideration of key issues.

Self-hypnosis has been studied in a handful of areas with specific applications. For that reason, we organized. studies into sections including applications of self-hypnosis dealing with pain, childbirth experience, pediatric applications, and stress and anxiety before we examined RCTs and reported a meta-analysis of our findings.

Pain and Self-Hypnosis

More studies have explored the effects of self-hypnosis on pain than any other application using self-hypnosis. Four studies (Jensen et al., 2009; Jensen et al., 2011; Lang et al., 2000; Tan et al., 2014) found that self-hypnosis outperformed active controls of EMG feedback, cognitive restructuring, structured attention, and sEMG-assessed relaxation training in reducing pain. Two additional studies (Lang, Joyce, Hamilton, Lee & Spiegel, 1996; Lang et al., 2006) reported that self-hypnosis outperformed more 'passive' control groups, including conscious sedation, empathy, standard care, or no active treatment. In these six studies self-hypnosis was preceded by hetero-hypnosis and all taught participants self-hypnosis skills. Additionally, most participants in

both Jensen et al. studies (2009; 2011) reported that they continued to use the skills they learned in treatment and experienced pain relief when they did so. Three of these studies (Jensen et al., 2009; Jensen et al., 2011; Tan et al., 2014) used audio recordings as part of the ongoing training, and three (Jensen et al., 2009; Jensen et al., 2011; Tan et al., 2014) had more than three practice sessions prior to testing. Of the studies that did offer audio recordings for practice, both Jensen et al. studies and the Tan et al. study also encouraged participants to practice without audio and to develop the skill set of self-hypnosis.

Studies have also used self-hypnosis for pain management in children. Of the two studies that met inclusion criteria, both (Liossi, White & Hatira, 2006; Olness, MacDonald & Uden, 1987) outperformed active controls of biofeedback, eutectic mixture of local anaesthetics, attention, and propranolol. In both studies, self-hypnosis was preceded by hetero-hypnosis. Neither supplemented the self-hypnosis training with audio recordings and both had daily, independent, self-practice sessions.

All of the eight studies reviewed indicate that self-hypnosis is useful in reducing pain, with six outperforming active control conditions and two outperforming passive control conditions. All studies preceded self-hypnosis with a session of hetero-hypnosis, and all encouraged independent practice of self-hypnosis. The use of audio recordings did not appear to be important in producing an effect for self-hypnosis.

Self-Hypnosis and Childbirth

Although hetero-hypnosis has been considered a potentially useful tool for application in obstetrics (Faymonville, Meurisse & Fissette,1999; Faymonville et al., 1995;

Faymonville et al., 2000; Hermes, Trübger, Hakim & Sieg, 2004; Landolt & Milling, 2011; Madden, Middleton, Cyna, Matthewson, & Jones, 2012), fewer studies have examined the effect of self-hypnosis.

Harmon, Hynan and Tyre (1990) reported that adding self-hypnosis training to childbirth education classes produced shorter Stage 1 labor, but did not affect Stage 2 labor. Self-hypnosis also resulted in the use of less medication during labor and higher infant Apgar scores. In this study self-hypnosis was preceded by hetero-hypnosis and included more than three sessions whereby self-hypnosis was practiced in self-directed fashion. According to the authors, skills mastery represents one of the reasons for the successful outcome of this study, which concurs with the evidence reported herein. As well as incorporating stress inoculation training (Meichenbaum, 1977) into the childbirth education, an ischemic pain task (IPT) was used to evaluate the analgesic effects of the hypnosis when learning self-hypnosis skills. The authors argued that by using the IPT, hypnotic subjects were able to demonstrate to themselves increasing pain control over pain across sessions, and that this confidence carried over into the delivery room.

Three RCTs have been conducted more recently that met review criteria (Downe et al., 2015; Werner, Uldbjerg, Zachariae, & Nohr, 2013; Werner, Uldbjerg, Zachariae, Rosen, & Nohr, 2013). Werner et al. (2013a) offered nulliparous female participants three self-hypnosis training sessions for coping with labor pain, which involved listening to audiotapes only with no preceding hetero- hypnosis session and no independent practice. The researchers found no difference between the self-hypnosis trained participants and the control group. In a subsequent review, Leap (2013) argued that just three single-hour classes late into pregnancy may not be enough to make a difference to reduce labor pain and use of epidural medication.

Another study by the same group (Werner et al., 2013b) in which self-hypnosis

did not outperform controls but were equally effective as relaxation, mindfulness, and usual care also did not include prior experience of hetero-hypnosis nor independent practice and the audio recordings used were brief. The authors noted that other randomized controlled studies that reported an effect of hypnosis or self-hypnosis have used more time-consuming interventions (2013a,). The authors also suggested that tailoring the training more specifically to the individual needs of the participants could have produced a different result.

The Downe et al., (2015) study was conducted by the National Health Service (NHS) in the UK and examined the use of self-hypnosis for intrapartum pain in pregnant nulliparous women. The self-hypnosis group in the study did not reduce labor epidural use which was its primary objective. This study taught self-hypnosis in two training sessions three weeks apart, did not involve any self-directed skills, and provided participants with a 26-minute audio disc to use at home.

Overall, the evidence suggests that the application of self-hypnosis in obstetrics is not efficacious. However, in both the Werner (2013) studies and the Downe et al (2015) study, self-hypnosis was defined as listening to audio recordings, involved no specific self-regulated self-hypnosis skills, and did not involve a preceding hetero-hypnosis session. Some might question if the mere absence of the hypnotist (as in the case of audio recordings only) is truly self-hypnosis. In the one study that involved self-directed practice sessions, an effect of self-hypnosis was observed (Harmon et al., 1990).

Stress, Anxiety and Hypertension

All three RCTs that explored the use of self-hypnosis to reduce stress, anxiety, and hypertension included training in self-hypnosis as a skill (Naito et al., 2003; O'Neill, Barnier & McConkey, 1999; Stanton, 1994). The studies found that self-hypnosis outperformed active controls (i.e., mock neurofeedback, relaxation, and conventional discussion of anxiety reducing methods, respectively). The Naito et al (2003) study was the only one in this section to feature audio recordings for self-hypnosis practice sessions, but the researchers also provided participants with hetero- hypnosis as a precursor. All three studies had participants practice the self-hypnosis skills more than three times following initial training. O'Neill, Barnier, and McConkey (1999) noted that participants in the self-hypnosis group exhibited a greater sense of expectation, treatment efficacy, and overall change cognitively and behaviorally, compared with participants in the relaxation group, which buttresses a case for self- hypnosis advancing self-efficacy. When treating stress, anxiety, or hypertension there is good evidence that self- hypnosis is effective both when self-hypnosis is defined as a hetero-hypnosis precursor plus audiotape-based individual sessions and when it involves multiple self- directed self-hypnosis training sessions.

Additional RCTs

Outside of the specific areas covered so far, several other RCTs examined self-hypnosis. Researchers have studied self-hypnosis has with a view to strengthening immune functioning (Barabasz, Higley, Christensen & Barabasz, 2010; Gruzelier, Williams, & Henderson, 2001; Gruzelier, Smith, Nagy, & Henderson, 2001) with encouraging results, yet only a single study matched our inclusion criteria: Ruzyla-Smith and colleagues (1995) documented that self-hypnosis outperformed floatation tank relaxation (Restricted Environmental Stimulation Therapy) at improving immune functioning.

The program included daily self-practice of the self-hypnosis skills and an initial hetero-hypnosis experience using an audio recording. Audio recordings were not used for self-hypnosis practice sessions.

Self-hypnosis outperformed active controls of masking and attentiveness for alleviating tinnitus (Attias et al., 1993) in a study in which hetero-hypnosis was a precursor and audio recordings were used for practice. Self-hypnosis plus anti-allergic therapy outperformed anti-allergic therapy alone for reducing hay fever symptoms (Langewitz et al., 2005) in research in which hetero-hypnosis was a precursor and self-directed practice was implemented thereafter. Zobeiri, Moghimi, Ataran, Ashari, and Fathi (2009) reported that self-hypnosis attenuated the severity of asthma symptoms and outperformed usual medication in a study that involved only self-directed self- hypnosis practice.

Swirsky-Sachetti and Margolis (1986) found that a self-hypnosis program significantly reduced the amount of factor viii used to control bleeding among haemophiliacs and significantly reduced general distress levels compared with a wait list control group. Hetero-hypnosis was a precursor and ongoing audio recordings were used for self-hypnosis practice; participants were then encouraged to create their own inductions and suggestions.

Laidlaw, Bennett, Dwivedi, Naito and Gruzelier (2006) used self-hypnosis as part of a program to maintain health and well-being in women with metastatic breast cancer. Women in the self-hypnosis group outperformed women in the waiting list control group, and self-hypnosis was found to be comparable to the active control group in terms of quality of life and mood. Hetero-hypnosis was a precursor and the self-hypnosis practice sessions were supported with audio recordings. Particpants were encouraged to generate their own suggestions and imagery as they progressed.

Finally, Farrell-Carnahan et al. (2010) used self-hypnosis to treat insomnia among cancer survivors. Participants in the hypnosis group performed no better than participants in a wait list control group. Individuals were encouraged to practice audio content from memory verbatim. In line with findings reviewed previously (Downe et al., 2015; Werner, Uldbjerg, Zachariae, & Nohr, 2013; Werner, Uldbjerg, Zachariae, Rosen, & Nohr, 2013) the Farrell-Carnahan et al. (2010) study suggests that self-hypnosis is not effective when it involves audio recordings only.

Two of the seven studies in this section (Attias et al., 1993; Farrell-Carnahan et al., 2010) did not teach or encourage self-directed and self-regulated practice of self-hypnosis, and of those two studies, Attias et al. (1993) was the only one to reveal an effect for self-hypnosis (which also outperformed an active control). The Attias et al. (1993) study was the only one to have a precursor of hetero-hypnosis followed by exclusively audio recordings. All seven studies in this section encouraged four or more sessions of practice prior to testing.

Summary

Of the 22 studies reviewed, 18 found that self-hypnosis was an effective treatment, with 14 studies outperforming active controls. Of the four studies that did not find any effect compared with controls, self-hypnosis involved listening to hetero-hypnosis recordings only, none taught any self-directed or self-regulated skills, and three of the studies had three or fewer audio-led practice sessions.

Twelve of the 22 studies used audio recordings. Four used hetero-hypnosis audio recordings only (the four mentioned in previous paragraph) as the self-hypnosis offering in the study, whereas the remaining eight used audio recordings to supplement

self-directed self-hypnosis practice. Of those eight, all showed an effect, with seven outperforming active controls.

Seventeen of the 22 studies taught and encouraged the use of self-directed and self- regulated skills. All of the 17 studies that encouraged self-directed and self-regulated skills documented an effect for self-hypnosis, and 16 outperformed active controls. Fourteen of the studies used more than three practice sessions, and seven used self-directed practice supplemented with audio recordings. Of the 10 remaining studies that encouraged self-directed and self- regulated practice, which were not supplemented with audio recordings, all outperformed active controls.

Sixteen of the 22 studies included more than 3 practice sessions, of which 15 were effective and 14 of those outperformed active controls. Of the six studies that used three or fewer practice sessions, three demonstrated an effect and all outperformed active controls.

Fourteen of the 22 studies used hetero-hypnosis as a precursor to self-hypnosis; 13 of those 14 revealed an effect for self-hypnosis, and all 13 outperformed active controls. Of the six studies with no hetero-hypnosis as a precursor, two showed an effect that outperformed active controls, both of which had more than three practice sessions and taught self-directed and self-regulated skills. The four studies with no hetero-hypnosis precursor and showed no effect, all used hetero-hypnosis audio recordings only and none taught self- directed or self-regulated skills. One single study that showed an effect for self-hypnosis, which outperformed an active control, had hetero-hypnosis as a precursor followed by audio recordings with no self-directed or self-regulated practice.

The main ingredients that seem common to the successful outcomes reported herein appear to be that (a) individuals are taught self-regulated and self-directed skills and (b) have an opportunity to practice self-hypnosis on more than three

occasions. Although there is also a case to be made for a precursor of hetero-hypnosis and for self-hypnosis practice to be supplemented with audio recordings, it is not as convincing as the importance of the first two ingredients. Exclusive use of audio recordings as self-hypnosis appear to lead to negative outcomes.

Meta-analysis

We used test statistics to compute effect sizes where comparisons were made between the self-hypnosis group and a control group. The effect sizes are expressed as correlation coefficients following recommendations of Field and Gillett (2010). To avoid the problem of potential bias resulting from using multiple effect sizes from the same study, only the average effect size from each study was used such that each study only contributed a single effect size to the meta-analysis (Rosenthal, 1991). This approach applied even when there was more than one control group. Hedges and Vevea's (1998) method was applied throughout; a random effect conceptualization of the meta- analysis was used. The effect sizes entered into the meta-analysis for each study are listed in Table 1 in the "Is there an effect?" column. We were able to compute effect sizes for 17 of the 22 studies that fit the systematic review criteria. In five of the 22 studies relevant descriptive and test statistics were not reported to enable computation of effect sizes and the authors of those studies did not respond to requests for the relevant statistics.

Hedges and Vevea's (1998) estimate of between studies variance was 0.1069 and a Chi-square test of homogeneity of variance of effect sizes was significant ($\chi^2(16) = 47.34$, $p < .001$), indicating large variation in effect sizes overall. The mean effect size based on Hedges and Vevea's (1998) random-effects model was .536 (the 95% confidence interval was .398 (lower) and .650 (upper)) for which the z-score was significant ($z = 6.635$, p ,.001) and is a large effect size according to Cohen's (1988) criterion.

Estimating and correcting for Publication Bias

A publication bias analysis, as described by Rosenthal (1991), revealed that 1417 new, unpublished, filed, or unretrieved studies would be needed to render this average effect size non-significant. Begg and Mazumdar's (1994) rank correlation test for publication bias produced $\tau(N = 17) = .568$, $p < .01$, indicating significant publication bias. As a further test for publication bias we ran the Vevea and Woods (2005) weight function model, which is optimal for meta-analyses with small sample sizes. Vevea and Woods model produced an unadjusted population effect size of 0.571 similar to the value reported above. Four corrected population effect sizes were also produced representing corrections resulting from four different selection bias models that involve typical estimated weight functions in applications of the Vevea and Hodges model. A moderate one-tailed selection bias resulted in a corrected population effect size of 0.505 which represents only 11.5% drop in effect size estimate. The corrected population effect sizes for a moderate and severe two-tailed selection bias (in which near zero correlations are less likely but significant positive or negative correlations are equally favored) produced a 1.9% (0.56) and 4% (0.548) drop respectively. These small changes to the population effect sizes following corrections suggest little publication (or any other) bias. However, correction to a severe one-tailed selection bias resulted in a 33.5% drop (to 0.38) in population effect size. Even within this restricted set of weight functions, we have identified a possible selection bias. The true population effect size is thus likely to be smaller than the unadjusted effect size reported above; perhaps more likely to be in the medium-to-large effect size range according to Cohen's criterion.

The funnel plot in Figure 1. shows what is known as the small study effect where the smaller studies typically have the larger effect sizes. However, in the present set of studies it is clear that there is a potential confound in that the largest

studies (Downe et al., Werner et al., 2012; 2013) were also the studies that did not include skill acquisition and self-directed self-hypnosis. Moderator analysis would be useful to some extent in this situation but, given the above confound and the limited number of studies available, moderator analysis would lack validity and power. Future updates to the present meta-analysis should investigate the potential moderating effects of: exposure to hetero-hypnosis, whether skill acquisition was part of the study design, the use of audio tapes as self-hypnosis, and the number of training sessions.

Variation in the definition of and methodological approaches to self-hypnosis

The approaches of modern authors to the topic of self-hypnosis reveals a wide range of definitions and methodological approaches. There are clearly different approaches represented in the 22 studies the met our inclusion criteria. These differences are also reflected in the wider literature. For example, much of the research conducted by Fromm et al. (1981) used participants who had previous experience of hetero-hypnosis. In contrast, some researchers have only worked with people who have had no previous clinical experience of hypnosis, and have provided their subjects with minimal instructions on what to do (Ruch, 1975). In some studies participants engaged in self-hypnosis while the experimenter sat silently with them (Johnson & Weight, 1976, whereas in other studies, subjects were asked to read and follow a full induction procedure by themselves (Shor & Easton, 1973). Although some authors have argued that having had a hetero-hypnosis experience is likely to influence the way an individual relates to and uses self-hypnosis (Gardner, 1981; Sacerdote, 1981)., other authors (Ruch, 1975; Johnson and Weight, 1976) have suggested that self-hypnosis is better learned first to advance ongoing hetero-hypnosis. Our review provides evidence that a hetero-hypnosis precursor to self-hypnosis is not necessary for an effect of self-hypnosis to be observed, although it is clear that these issues need

to be further explored through research. A crucial question is how different forms of self-hypnosis modify the effectiveness of the treatment. Certainly, it is difficult to dissociate self- and hetero-hypnosis when self-hypnosis is defined as hetero-hypnosis followed by audio recordings of hetero- hypnosis. If self-hypnosis is to have a separate identity it is surely better for research to explore the benefits of self-directed, self-regulated hypnosis before more closely matching it to hetero-hypnosis. Self-directed and self-regulated hypnosis are also likely to produce the added benefit of the development of self-efficacy (Fromm et al., 1981; Handelsman, 1984; Olness, 1975).

Many of the studies that reporting an effect of self-hypnosis described it as a skill that can be practiced and improved (cf. Harmon, Hynan, & Tyre, 1990; Jensen, 2009; Lang et al., 1996; Liossi, White & Hatira, 2006; Tan et al., 2014). When self-directed sessions are part of the method, the exact number of independent practice sessions in the studies varies greatly and, in some studies, the exact number of self-directed practice sessions was not reported. Future studies should aim to examine the number of sessions needed to derive maximum benefit of self-hypnosis, with the caveat that this number might vary from suggestion to suggestion and as a function of hypnotic suggestibility. Similarly, the amount of specific self- hypnosis training sessions provided to participants by the instructor was found to vary across the studies and warrants further investigation, especially regarding optimal development of the skill.

Conclusion

The reviewed literature indicates that self-hypnosis is effective with meta-analysis revealing a medium-to-large effect size. RCTs for various medical needs have shown self-hypnosis to be at least as effective as other better-perceived

treatment tools such as relaxation and mindfulness. Indeed, many researchers have promoted the notion of using self-hypnosis alongside other methods given that each varies in their effectiveness and potential mechanism of effect.

In the Tan et al. (2014) study, the findings indicate that two sessions of self-hypnosis training may be as effective as eight sessions of hetero-hypnosis treatment. Results from other studies may give cause to suggest self-hypnosis can be successful when hetero-hypnosis is not. In the Downe et al (2015) and Werner et al (2013a; 2013b) studies the authors were unable to demonstrate an effect, which may have been due to absence of common ingredients of studies whereby an effect was demonstrated; notably, teaching self-hypnosis as a self-regulated skill. Some might question whether the use of audio recordings as the sole means of self-hypnosis as employed by Downe et al (2015) and Werner et al (2013a; 2013b) is actually different from hetero-hypnosis. That recorded hetero-hypnosis audio sessions failed to outperform controls where purely self-directed (i.e. not using audio recordings) self-hypnosis showed an effect (see Harmon, Hynan, Tyre, 1990) implies that sometimes self-hypnosis can be successful when hetero-hypnosis is not and warrants further investigation.

The portability of self-hypnosis is potentially its greatest contribution (Orne, 1990). The self-directed nature of self-hypnosis can broaden its applicability for patient use in noisy conditions such as labor and birthing and surgical environments. The autonomy of the individual is fostered because he or she can use self-hypnosis independently, in a variety of circumstances and situations. Self-hypnosis has the potential benefit therefore of promoting self-efficacy (Fromm et al., 1981; Handelsman, 1984; Olness, 1975) with reported benefits such as self-esteem enhancement and validation of coping abilities (Olness, McDonald & Uden, 1987).

A wide variety of methods are deemed to constitute self- hypnosis; so much so that Landolt and Milling (2011) called for ‘treatment manuals’ to create more consistency in the way hypnosis training is offered to individuals learning to use it for themselves. Salter’s *Three Techniques of Autohypnosis* (1941), one of the earliest academic journal articles on the subject of self-hypnosis, recommended a three-stage process of education, demonstration, and practice of self- directed skills. This approach is supported by the evidence presented here.

The evidence is generally positive regarding the efficacy of clinical self-hypnosis. No adverse side-effects were reported in any of the studies reviewed, and self-hypnosis training may offer a cost-effective alternative to some forms of standard care. In fact, authors of the three largest studies included in this review (Downe et al., 2015; Werner et al., 2013a; Werner at al., 2013b) state that the self-hypnosis training was cost-effective. These studies did not demonstrate a significant positive effect, potentially attributed to the passive use of audio recordings as a form of self- hypnosis. The addition of teaching self-directed skills, as recommended in this review, would not add cost, and the lack of necessity to provide audio recordings also has the potential to reduce cost further.

It is clear, however, that more research is required to document the effectiveness of self-hypnosis and the range of potential applications of self-hypnosis. Self-hypnosis should not be considered a global panacea and research, as with research into hetero-hypnosis, should aim to identify where it is useful and where it is not. By doing so we will gain a better understanding of what self-hypnosis is and does and how it produces its effect and in what contexts. An understanding of self-hypnosis and its sibling, hetero- hypnosis, and its cousin, placebo effects, might eventually lead to a common framework of understanding the mechanisms of potentially related methodologies to treat a variety of psychological and medical

conditions.

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Table. 1 - Self-Hypnosis Randomised Controlled Trials:

Key:

Study – The name, date and authors of the study, categorised into sections of relevance; pain, immune functioning, paediatrics, etc. Each category is discussed in more detail within this review. Please note, there is some cross-over; pain alleviation in obstetrics is placed in 'obstetrics' in the table, pain with children is placed in 'paediatric' section if the table. Both could easily be slotted into the specific 'pain' section.

Hetero-hypnosis experience – did the methodology begin with an initial use of hetero-hypnosis before the subject was expected to use self-hypnosis? Was hetero-hypnosis a precursor to self-hypnosis? Hetero-hypnosis here is defined as hypnosis conducted by a trained facilitator who is with the subject whilst hypnotising the subject. This can be one-to-one or in a group.

Training skills given? – Were the subjects given skills to apply self-hypnosis in a self-directed way (perhaps including creation of own suggestions and images etc. or otherwise, following a prescribed protocol by themselves).

Audio? – Were the subjects of the study given audio tracks to use and passively follow? This does not refer to the education or instruction being given by audio, but whether the self-hypnosis sessions themselves were delivered using audio.

No. of sessions <3? – Were the total number of self-hypnosis sessions prior to testing greater than 3? The total number of sessions are given.

Active control group? – Were the control group (or at least one of the control groups) using a direct strategy rather than being a passive control group e.g. Standard care, wait list, listening to audio. Where there was more than a single control group, all have been listed and rated as active or not.

Participant number – The number of study participants assigned to a self-hypnosis experimental group (SH) and control group (CG) are indicated. Where the study used a within-subject (WS) treatment design and participants received each of the treatment conditions, this is indicated.

Is there an effect? – Those with a (1) outperform active control groups. A (2) represents outperforming a passive control group (wait-list control, standard care). Effect sizes (or average effect sizes for those studies reporting multiple comparisons between groups) are also given here. All effect sizes reported are effect size r which were used in the reported meta-analysis.

Study (Categorised)	Hetero-hypnosis experience?	Training skills given?	Audio?	No. of sessions <3?	Active control group?	Participant number	Is there an effect? (control type)
Pain:							
Jensen et al., (2009) *Effects of self-hypnosis training and EMG biofeedback relaxation training on chronic pain in persons with spinal-cord injury*.	Yes.	Yes.	Yes.	Yes. (10 sessions, plus encouraged to practice alone daily)	Yes. (EMG biofeedback)	14 (SH) 14 (CG)	Yes. (1) Hypnosis > EMG feedback (r = 0.39).
Jensen et al., (2011) *Effects of self-hypnosis training and cognitive restructuring on daily pain intensity and catastrophizing in individuals with multiple sclerosis and chronic pain*.	Yes.	Yes.	Yes.	Yes. (4 sessions plus encouraged to practice alone daily)	Yes. (Cognitive restructuring) AND Yes. (Education on pain given)	15 (Within-subject design)	Yes. (1) Hypnosis > Cognitive restructuring AND Yes. (1) Education (r = 0 .94)
Lang et al., (1996). *Self-hypnotic relaxation during interventional radiological procedures: Effects on pain perception and intravenous drug use*.	Yes.	Yes.	No.	No. (Single session only preceded procedure)	No. (Conscious sedation)	16 (SH) 14 (CG)	Yes. (1) Hypnosis > Conscious sedation (relevant statistics not reported to enable computation of effect size)
Lang et al., (2000). *Adjunctive non-pharmacological analgesia for invasive medical procedures: A randomised trial*.	Yes.	Yes.	No.	No. (Single session only preceded procedure)	Yes. (Structured attention) AND Standard care control group	82 (SH) 79 (CG – standard care) 80 (CG – structured attention)	Yes. (1) Hypnosis > Structured Attention AND Yes. (1) > Standard care (r = 0.22)
Lang, and colleagues (2006) *Adjunctive self-hypnotic relaxation for outpatient medical procedures: A prospective randomized trial with women undergoing large core breast biopsy*.	Yes.	Yes.	No.	No. (Single session only preceded procedure)	No. (Empathy) AND Standard care control group	78 (SH) 76 (CG – standard care) 82 (CG – structured empathetic attention)	Yes. (2) Hypnosis > Empathy AND Yes (1) > Standard Care (relevant statistics not reported to enable computation of effect size)
Tan et al., (2014). *A randomized controlled trial of hypnosis compared with biofeedback for adults with chronic low back pain*.	Yes.	Yes.	Yes.	Yes. (One group had 8 sessions) And Yes. (One group had 8 sessions plus self-directed practice)	Yes. (Biofeedback)	15 (SH – 8 sessions without practice) 24 (SH – 8 sessions with practice) 22 (SH – 2 sessions with practice)	Yes. (1) Hypnosis > Biofeedback (r = 0.22)

				And No. (One group had 2 sessions plus practice)		18 (CG – biofeedback)	
Obstetrics:							
Downe, et al., (2015) *Self-hypnosis for intrapartum pain management in pregnant nulliparous women: a randomised controlled trial of clinical effectiveness.*	No.	No.	Yes. (To be listened to at home)	No. (2 x 90 minute training sessions, 3 weeks apart)	Yes. (Usual NHS antenatal care)	337 (SH) 335 (CG)	No. Hypnosis = usual care (r = 0.03)
Harmon, T. M., Hynan, M. T., & Tyre, T. E. (1990). *Improved obstetric outcomes using hypnotic analgesia and skill mastery combined with childbirth education.*	Yes.	Yes.	Yes.	Yes. (6 sessions plus daily practice with audio recordings)	Yes. (Audio recordings that involved actively engaging and following instructions)	30 (SH) 30 (CG)	Yes. (1) Hypnosis > Audio recordings. (r = .71)
Werner et al., (2013) *Effect of self-hypnosis on duration of labor and maternal and neonatal outcomes: a randomized controlled trial.*	No.	No.	Yes.	No. (3 sessions in total, hypnosis delivered by audio only)	Yes. (Active comparator - body awareness, relaxation, mindfulness) AND Standard care control group	497 (SH) 495 (CG – active comparator) 230 (Usual care)	No. Hypnosis = Body awareness, relaxation, mindfulness) AND No. Standard care. (r = 0.016)
Werner et al., (2013) *Self-hypnosis for coping with labour pain: a randomised controlled trial.*	No.	No.	Yes.	No. (3 sessions in total, hypnosis delivered by audio only)	Yes. (Active comparator - body awareness, relaxation, mindfulness) AND Standard care control group	497 (SH) 495 (CG – active comparator) 230 (Usual care)	No. Hypnosis = Body awareness, relaxation, mindfulness AND = Usual care (r = 0.0836)
Paediatric:							
Liossi, White & Hatira (2006) *Randomized clinical trial of local anesthetic versus a combination of local anesthetic with self-hypnosis in the management of pediatric procedure-related pain.*	Yes.	Yes.	No.	Yes. (3 sessions plus self-practice)	Yes. (EMLA - Eutectic mixture of local anaesthetics and attention)	15 (SH + EMLA) 15 (CG – only EMLA) 15 (CG – EMLA + Attention)	Yes. (1) Hypnosis > EMLA (r = 0.82)
Olness, MacDonald & Uden (1987) *Comparison of self-hypnosis and propranolol in the treatment of juvenile*	Yes.	Yes.	No.	Yes. (5 sessions plus 2 self-practice sessions daily)	Yes. (Propranolol)	14 (SH) 14 (CG)	Yes. (1) Regarding headache frequency. AND

classic migraine.							Yes. (2) Regarding severity of headaches. (relevant statistics not reported to enable computation of effect size)
Stress, anxiety, hypertension:							
Naito et al., (2003) *The impact of self-hypnosis and Johrei on lymphocyte subpopulations at exam time: a controlled study*.	Yes.	Yes.	Yes.	Yes. (4 sessions, and daily self-practice)	Yes. (Johrei) AND Yes. (Mock neurofeedback relaxation)	16 (SH) 16 (CG – Johrei) 15 (CG – mock neurofeedback)	Yes. (1) Hypnosis > Mock neurofeedback relaxation AND Yes. (2) Hypnosis = Johrei (r = 0.29)
O'Neill, Barnier & McConkey (1999) *Treating anxiety with self-hypnosis and relaxation*.	No.	Yes.	No.	Yes. (Daily practice for 28 days)	Yes. (Relaxation)	10 (SH) 10 (CG)	Yes. (1) Hypnosis = Relaxation (r = 0.9)
Stanton (1994) *Self-hypnosis: One path to reduced test anxiety*.	No.	Yes.	No.	Yes. (2 x 50 min self-hypnosis training sessions given then regular practice encouraged)	Yes. (conventional discussion of anxiety reducing methods)	20 (SH) 20 (CG)	Yes. (1) Hypnosis > Conventional discussion. (r = 0.97)
Other RCTs:							
Attias et al., (1993). *Comparison between Self-Hypnosis, Masking and Attentiveness for Alleviation of Chronic Tinnitus.*	Yes.	No.	Yes.	Yes. (5 sessions plus practice with audio when alone)	Yes. (Masking and attentiveness)	15 (SH) 15 (CG – attentiveness) 14 (CG – masking)	Yes. (1) Hypnosis > Masking and attentiveness (r = 0.57)
Farrell-Carnahan et al., (2010) *Feasibility and preliminary efficacy of a self-hypnosis intervention available on the web for cancer survivors with insomnia*.	No.	No. (Could practice audio content from memory, but not create own content)	Yes.	Yes. (4 sessions plus listen to audio thereafter)	No. (Wait list)	14 (SH) 14 (CG - wait list)	No. (r = 0.08)
Laidlaw et al., (2005) *Quality of life and mood changes in metastatic breast cancer after training in self-hypnosis or Johrei: A short report.*	Yes.	Yes.	Yes.	Yes. (4 sessions plus daily practice)	Yes. (Johrei) AND Wait list control group	7 (SH) 4 (CG – Johrei) 3 (CG – wait list)	Yes. (2) Hypnosis > Wait list AND Hypnosis = Johrei (r = 0.72)

Langewitz et al., (2005) *Effect of Self-Hypnosis on Hay Fever Symptoms: A Randomised Controlled Intervention Study*.	Yes.	Yes.	No.	Yes. (2-5 sessions, plus self-guided practice at onset of symptoms)	Yes. (Anti-allergic therapy) AND. Standard anti-allergic medication AND Comparison with retrospective measurement of symptoms	40 (SH) 39 (CG)	Yes. (1) Hypnosis > Anti-allergic therapy AND Yes (1) Hypnosis > Medication (relevant statistics not reported to enable computation of effect size)
Ruzyla-Smith et al., (1995) *Effects of Hypnosis on the Immune Response: B-Cells, T-Cells, Helper and Suppressor Cells*.	Yes. (Via initial audio)	Yes.	No.	Yes. (2 initial sessions, then self-practice, twice daily for a week)	Yes. (Restricted Environmental Stimulation Therapy) AND Wait list control group	20 (SH) 19 (CG – relaxation) 16 – (CG wait list)	Yes. (1) Hypnosis > Relaxation AND Yes. (2) Hypnosis > Wait list. (r = 28)
Swirsky-Sacchetti and Margolis (1986) *The effects of a comprehensive self-hypnosis training program on the use of Factor VIII in severe hemophilia*.	Yes.	Yes.	Yes.	Yes. (6 sessions)	No. (Wait list))	13 (SH) 11 (CG)	Yes. (1) Hypnosis > Standard care (r = 0.74)
Zobeiri et al., (2009). *Self-Hypnosis in Attenuation of Asthma Symptoms Severity*.	No.	Yes.	No.	Yes. (Single session, then once a day at least throughout study)	No. (Usual medication)	20 (SH) 20 (CG)	Yes. (1) Hypnosis > Medication (relevant statistics not reported to enable computation of effect size)

Figure captions

Figure 1. Funnel plot of self-hypnosis effect sizes.