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MOOD CHANGES AFTER SELF-HYPNOSIS AND JOHREI PRIOR TO EXAMS

Tannis M. Laidlaw, Akira Naito, Prabudha Dwivedi, Nicholas A. Enzor, Christine E. Brincat and John H. Gruzelier

Imperial College London, UK

Abstract

Before course examinations, 48 university students were randomized to four weeks of training in self-hypnosis, a Japanese method for enhancing well-being, Johrei, or to a control procedure shown to produce self-reported relaxation and consisting of EEG-biofeedback with false feedback. Participants were examined with mood scales, EEG and immune parameters on three occasions: prior to training, after the month of training, and again two to three months later. The mood results are reported here. Although all participants reported an increase in negative mood with exams, especially an increase in tension, both self-hypnosis and Johrei buffered the effects of exam stress relative to the control group on depression, confusion and loss of vigour. These were extended with Johrei to include self-rated anxiety, depression and anger, while self-hypnosis evinced advantages over Johrei on diary reports of mood post-training. The advantages immediately following training for self-hypnosis and Johrei over the control relaxation procedure were to a large extent sustained at follow-up, by which time home practice had reduced. Advantages were unrelated to expectations about outcome before training although beliefs after training were related to absorption abilities. Johrei appears a promising procedure for maintaining equilibrium of mood in the face of stress, despite the scepticism of the participants.

Key words: hypnosis, stress, mood, healing, examinations

Introduction

Therapeutic hypnosis is one of the complementary therapies that sit relatively comfortably between conventional and unconventional medicine. It has been investigated in many interventionist studies as a method to alleviate general distress, anxiety or to raise negative mood levels (for example, Kingsbury, 1988; Laidlaw and Willett, 2002). University examinations have provided a naturalistic stressor of some severity and strategic convenience for interventionist and especially psychoneuroimmunological studies. Hypnosis in this context has been shown to improve mood (Kiecolt-Glaser, Glaser, Strain, Stout, Tarr, Holliday and Speicher, 1986). It has also been shown simultaneously to up-regulate various immune parameters such as Natural Killer Cells (NKC) and their measurable activity, T-cells that carry CD4+ and CD8+ surface markers, and endocrinological measures such as cortisol, all with the inference that changes found are advantageous for health and well being (Kiecolt-Glaser, Glaser, Strain et al., 1986; Ruzyla-Smith, Barabasz, Barabasz and Warner, 1995; Gruzelier, Clow, Evans, Lazar and Walker, 1998; Gruzelier, Smith, Nagy and Henderson, 2001b). Importantly, there are a few studies that have given credence to this assumption by also monitoring health along with immunological and mood changes after training in self-hypnosis. These have provided some validation for beneficial influences of mood and immunological up-regulation on health (Fox, Henderson, Barton, Champion, Rollin, Catalan, McCormack and Gruzelier, 1999; Gruzelier, Champion, Fox, Rollin, McCormack, Catalan, Barton and Henderson, 2002b) and have included advantages in the face of exam stress (Gruzelier et al., 2001b).

Here we extend our studies of the impact of exam stress in medical students to compare self-hypnosis training with a Japanese method used to enhance well-being called Johrei, which has not previously been studied scientifically in an exacting way. Johrei, or 'purification' in English, combines a Qigog-like procedure with a philosophy of life emphasizing the importance of aesthetics and pure food and farming practices.

In Japan, Brazil, Thailand and elsewhere Johrei has up to 5 million adherents and is used daily as part of family routine for good health and well-being with each participant taking turns at being both practitioner and recipient (Clarke, 2000). Like many other healing methods, the intention is one of beneficence and goodwill towards the recipient. The process is a quiet one, and the ambience of the procedure is inherently pleasant as the Johrei practitioner concentrates on the transmission to the recipient of subtle energies through the metaphor of light. The recipient in turn visualizes images of light received.

We also included a relaxation intervention, which is the neurofeedback control procedure previously used (Egner, Strawson and Gruzelier, 2002) for the purpose of controlling for both relaxation and expectancy effects. The participant underwent 20 to 30 minutes of quiet relaxation while given false feedback of another person's EEG recordings, the procedure for which is explained in the methods section. The condition appeared extremely high-tech, with two computers, electrodes fixed on ears and in the centre of the scalp, and with auditory 'feedback' via earphones of pre-recorded sessions from other people over eight sessions. In fact this was just as relaxing as true feedback according to self-ratings on the Thayer activation and deactivation scales (Egner et al., 2002). Relaxation has been associated with some of the same findings as self-hypnosis with several studies showing an increase in NKC activity (Kiecolt-Glaser, Garner, Speicher, Penn, Holliday and Glaser, 1985; Mizuno, Hosak, Ogihara, Higano and Mano,1999) and/or in mood (Whitehouse, Dinges, Orne, Keller, Bates, Bauer, Morahan, Haupt, Carlin, Bloom, Zaugg and Orne, 1996; Fox et al., 1999; Burns, Harbuz, Hucklebridge and Bunt, 2001).

Thus the study set out to provide the first controlled study of the efficacy of Johrei, which is reputed to re-establish or maintain homeostasis on immunological and mood variables. In fact the use of Johrei with a group of young, sceptical, scientifically oriented medical students would provide a particularly stringent test of its efficacy. The study also afforded a replication of hypnosis's ability to up-regulate mood (Kiecolt-Glaser, Glaser, Strain et al., 1986) and maintain immunological factors such as NKC activity and CD8+ t-cells percentages (Gruzelier et al., 1998; Gruzelier et al. 2001b; Gruzelier, Levy, Williams and Henderson, 2001a) in the face of exam stressors. At the same time while medical school exams have ecological validity as a life event stressor, they occur against a background of other life stressors and cannot always be expected to produce a clear-cut impact on mood, health and immune function (Kiecolt-Glaser, Glaser, Strain et al., 1986; Whitehouse et al., 1996; Gruzelier et al., 2001a; Gruzelier et al., 2001b; Gruzelier, 2002a; Gruzelier, 2002b). Nor do they elicit a universal reaction either emotionally or immunologically. This paper will report on the changes in distress and mood variables, with papers to follow that will report upon the immunological and electroencephalographic variables.

Methodology

Subjects

Forty-eight students (39/48 were medical students) were randomly assigned to attend weekly sessions to be trained in and subsequently practise at home either self-hypnosis or Johrei, or experienced eight sessions of neurofeedback over a period of one month. They were given detailed information sheets and informed consent was obtained. The age range was 19–23 years, excepting one participant who was 37 years (mean = 21.35). There were 22 males and 26 females. Sixteen participants were assigned to each group. Participants were paid £30 for completion of the study and given a simple breakfast on the blood-test days.

Intervention groups

The self-hypnosis training, designed and run by an experienced clinical hypnotist, TL, started with learning a Spiegel-type eye-roll for 'instant' relaxation, which could then be combined with specific immune imagery (Spiegel, 1972). Secondly, they were taught a slower relaxation-type induction, again to be combined with the immune imagery, and all were provided with a standard tape recording using a relaxation induction that included the imagery description. The students were invited to use whichever method suited them best and, upon feedback, students quickly settled on a preferred method for the rest of the trial period. Further to the basic immune imagery, all students were taught how to use breathing control for acute anxiety (Laidlaw, 1994) and the Interrupt Distraction Technique (IDP) (Laidlaw, 1999b) for worries and belief change to be used on an *ad hoc* basis. It was requested that each student used self-hypnosis three times a day to learn the technique for the first fortnight and once a day after that. Diary data suggested that most did their self-hypnosis somewhat more than once a day at the start, somewhat falling off towards the end of the study. Attendance at the training sessions was excellent.

The training in Johrei was planned and run by a trained practitioner from Japan, AN, who was also medically qualified. The four training sessions involved an introduction to the Johrei philosophy and the techniques of Johrei practice. The participants were requested to practise Johrei daily, mostly with a partner, and at the end of the training, self-Johrei was introduced. The majority of the trial period the participants were required to practise Johrei at home with another person. Diary feedback suggested that many did so, with a mean level of practice slightly under once a day, again falling off somewhat over the four weeks of training for the two groups doing home practice, self-hypnosis and Johrei (hypnosis: 1.75 falling to 1.31 times a day; Johrei: 0.80 to 0.72). By the second post-training, some two to three months later, most students had stopped filling out their diaries, and the study had anecdotal reports of most subjects stopping practice.

The relaxation control group was asked to come twice a week for a total of eight sessions of 'neurofeedback' and was not told that feedback was false. Each 30-minute session involved EEG electrodes applied to ears and centre of the head while the subject became comfortable in an armchair. Headphones were worn through which sounds could be heard: a babbling brook for 'alpha' waves, and sounds of the sea breaking on the shore for 'theta' waves. All instructions were usual for neurofeedback sessions, except that the sounds heard bore no relation to what was actually being picked up by the electrodes, but were instead, sounds pre-recorded from someone else, and played back through the headphones. This procedure, in spite of the lack of real feedback, is known to produce a valid experience of relaxation (Egner et al., 2002).

Design

The student subjects had examinations at two different times: within a few weeks of finishing their training, when practice sessions were still almost daily, and up to three months post-training when many subjects had stopped practising their training. This provided a test of whether proximity to training and regular practice provided protection for exam distress.

The three assessment times were as follows:

- Baseline: all subjects were tested just prior to starting their particular four-week training period (n = 47).
- Post-training 1: all subjects were tested within three weeks of completing training (n = 48). Twenty of these students were into their examination preparation period, and 28 were in normal term time.
- Post-training 2: as many students as were available were recalled for a third testing two to three months after training. Twenty-six were available, of whom 16 were in an examination preparation period.
- By combining the two post-training times, a set of students in examination circumstances was compiled (n = 36) and also compared with the remainder consisting of a non-exam stress post-training group.

Psychological measures

The psychological testing was by questionnaire with the following standardized tests:

- Profile of Mood States (POMS) (McNair, Lorr and Droppleman, 1992): a well-used mood inventory comprising 65 statements rated on a Likert five-point scale and divided into six components of mood, to be generalized over the past week.
- State Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch and Lushene, 1970): the most commonly used anxiety questionnaire comprising 20 anxiety-based questions on each of how the participant has been feeling generally over the past week (trait) and how they are feeling right now (state).
- Personalised Emotional Index (PEI) (Laidlaw, 1999a): 12 mood questions to be rated each day using a computer-constructed diary of participants' pre-selected words and phrases within set categories: six items were about positive emotions and six about negative emotions.
- Perceived Stress Scale (PSS) (Cohen, Kamarch and Merrnelstein, 1983): the longest of three versions designed to measure appraisal of stress with higher scores indicative of more stress.
- Harvard Group Scale of Hypnotic Susceptibility (HGSHSA) (Shor and Orne, 1962): the most frequently used group assessment tool for hypnotic susceptibility over several decades (Laidlaw and Large, 1997).
- Tellegen's Absorption Scale (TAS) (Tellegen and Atkinson, 1974): the Jamieson version (Jamieson, 1986).

Results

Table 1 shows the means and standard deviations for the mood variables at baseline and at the two post-training intervals. The mood variables include STAI anxiety, POMS mood distress, diary affect and the perceived stress (PSS).

Table 1. Mean scores for mood and anxiety variables at the three assessment points

	Mean baseline	(sd)	Mean post-training 1	(sd)	Mean post-training 2	(sd)
Hypnosis	n = 16		n = 16		n = 10	
STAI total	77.8	10.1	76.9	11.9	78.5	14.0
State	37.4	5.6	39.5	5.6	40.5	8.7
Trait	40.4	6.1	37.4	7.0	38.0	8.3
POMS total	236.8	39.9	224.6	39.2	258.8	30.2
Tension	54.9	5.7	55.7	6.5	69.0	2.3
Anger	65.8	10.4	63.1	10.7	65.7	8.4
Vigour	63.4	9.3	67.1	7.6	57.5	5.3
Confusion	58.6	10.1	55.1	7.6	57.7	8.4
Depression	61.9	8.2	59.6	7.6	66.1	7.8
Fatigue	59.1	7.5	58.3	9.8	57.8	7.8
PEI Diary	8.9	7.7	15.0	8.5		
Positivity	20.4	4.5	22.9	4.6		
Negativity	11.5	3.6	8.0	4.5		
PSS			22.4	7.1	23.4	7.7
Johrei	n = 16		n = 16		n = 9	
STAI total	74.1	13.6	73.1	11.5	79.8	19.7
State	34.9	8.0	35.8	6.7	40.9	12.8
Trait	39.1	7.8	37.3	6.4	38.9	8.7
POMS total	216.9	40.0	216.7	23.4	242.0	28.8
Tension	53.1	7.6	55.1	6.8	64.0	7.3
Anger	59.3	5.9	58.9	6.1	63.0	7.7
Vigour	58.4	18.0	64.5	6.4	61.8	6.4
Confusion	51.6	9.0	51.5	5.4	53.7	6.8
Depression	56.3	8.2	57.1	5.9	62.0	7.6
Fatigue	50.3	20.7	58.6	6.4	61.1	7.1
PEI Diary	9.6	4.0	11.1	7.8		
Positivity	20.4	3.0	21.2	3.8		
Negativity	10.8	4.0	10.1	4.9		
PSS			21.1	7.4	22.6	7.0
Relaxation	n = 15		n = 16		n = 7	
STAI total	64.8	8.4	67.0	9.1	84.9	21.6
State	31.1	4.3	33.8	5.4	46.5	12.3
Trait	33.7	6.1	33.3	5.6	38.4	11.0
POMS total	198.3	24.8	203.4	23.2	258.3	45.4
Tension	48.4	4.5	50.9	5.9	68.7	8.8
Anger	57.8	5.3	57.1	4.5	64.3	12.5
Vigour	66.2	6.6	66.6	5.4	58.1	6.7
Confusion	49.8	6.3	51.9	7.2	57.3	9.5
Depression	53.7	4.1	55.8	3.8	65.6	9.4
Fatigue	54.9	7.4	54.3	4.4	60.6	8.6
PEI Diary	9.8	5.6	12.9	6.9		
Positivity	19.2	3.2	21.3	4.0		
Negativity	9.4	4.8	8.4	4.3		
PSS			25.2	7.0	22.8	7.2

STAI and POMS

Baseline

With regard to the STAI, ANOVAs disclosed significant group effects for both state anxiety (F (2,47) = 4.35, *p* = 0.019) and trait anxiety (F (2,47) = 4.35, *p* = 0.019). These were due to lower anxiety in controls than in both the hypnosis group (state LSD = 6.30, *p* = 0.007; trait LSD, 6.71, *p* = 0.008) and to a lesser extent in the Johrei group (state LSD = 3.80, *p* = 0.10; trait LSD 5.46, *p* = 0.028). The Johrei and hypnosis groups themselves did not differ (state LSD 2.50; trait LSD 1.25).

As for the POMS, there were similar group differences (total POMS: F (2,46) = 4.46, *p* = 0 .017) with the groups ordered as for the STAI: control < Johrei < hypnosis. Multiple comparisons indicated that the control group was significantly less distressed at baseline than the hypnosis group (LSD 38.42, p < 0.005). Regarding subscales, four of the six showed significant group effects, with the group ordering as before: tension, anger, depression, confusion (F = 4.60 to 5.34, *p* = 0.015 to 0.008) with no group differences in vigour and fatigue.

Baseline versus post-training 1 and 2

The STAI showed that there was a significant session effect in state anxiety (F (2,50) = 8.35, *p* = 0.001) which took the form of a progressive increase in anxiety, expressed as a linear trend (F (2,25) = 10.47, *p* = 0.003) and with no interaction with group (F (4,50) = 1.56, *p* = 0.20). As can be seen in Figure 1, the control group first showed a tendency towards an increase in state anxiety between baseline and post-training 1 (*t* = 1.91, *p* = .078), and secondly a considerably larger increase in state anxiety from post-training 1 to post-training 2 (*t* = 3.16, *p* = .016). In contrast the hypnosis group showed a small linear increase in state anxiety across all sessions, whereas the Johrei group showed a reduction in anxiety at post-training 1 and an increase at post-training 2. In neither the self-hypnosis nor Johrei groups were the changes in anxiety from baseline significant (Fs = .83, 1.34, *p*s = 0.45, 0.29), mounting 3.55 and 4.89 points by the end of the study in contrast to the 14-point (33%) increase in the control group. Comparisons between the difference scores of the hypnosis (change from means of 36.9 to 40.5) and control (32.5 to 46.5) groups indicated a greater increase in anxiety in controls (F = 5.98, df = 1,17, *p* <0.026).

There was no change in trait anxiety overall, but there was a small but significant reduction with the post-training session 1 (F (1,44) = 4.575, *p* = 0.038). As can be seen in Table 1, while the reduction in trait anxiety was common to the Johrei and hypnosis groups, the control group showed an increase in trait anxiety differentiating it from both the treatment groups: Johrei (LSD 4.65, *p* = 0.035), hypnosis (LSD 5.34, *p* = 0.017).

POMS: for participants as a whole, there was an increase in distress in the total POMS scale and all subscales except fatigue by the third testing session. As can be seen in Figure 2, which depicts the total scores, while there was an increase in distress across sessions, there was a notable rise at post-training 2, as for state anxiety.

The consistency of these effects within groups was investigated with paired *t*-tests. From baseline to post-training 1, the relaxation control group had increases in tension (*t* = 2.19, *p* = 0.046) and depression (*t* = 2.02, *p* = 0.063) while the hypnosis and Johrei groups maintained their mood on all subscales (hypnosis *t* = –0.52 to 1.69); Johrei *t* = -1.00 to 0.63).

However, from post-training 1 to post-training 2, all groups showed significant increases in POMS general mood distress (hypnosis: *t* = 3.45, *p* = 0.007; Johrei: *t* = 3.81, *p* = 0.005; and subscales relaxation: *t* = 4.93, *p* = .003) and tension in particular

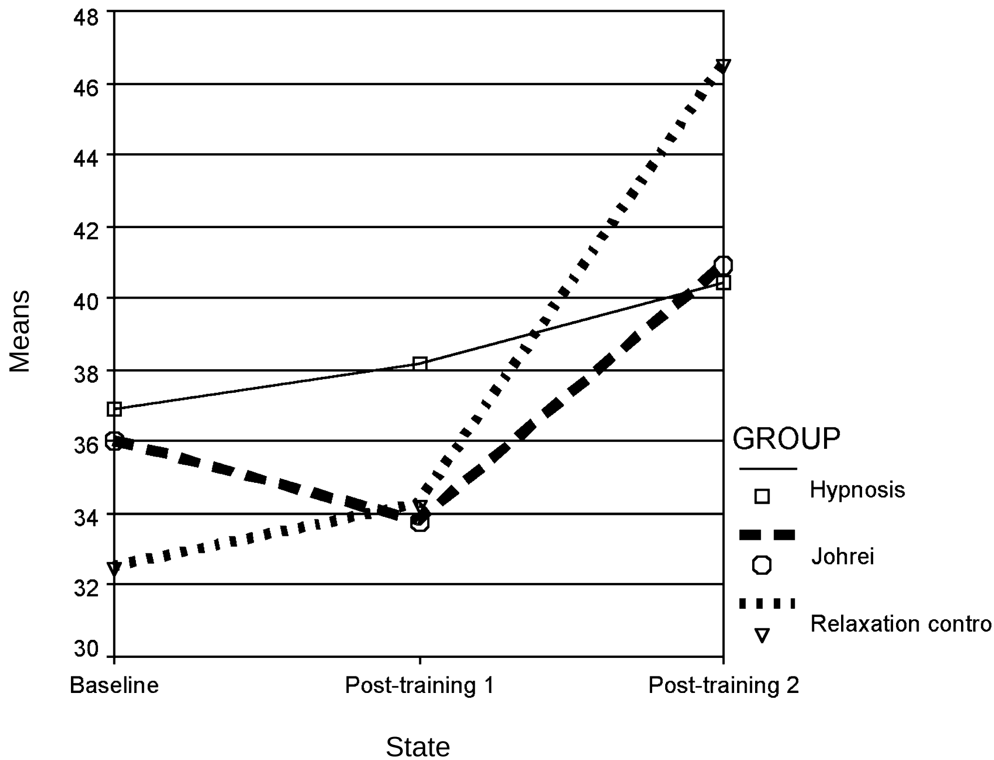

Figure 1. State anxiety over three times of assessment.

(hypnosis: $t = 7.02$, $p = .000$; Johrei: $t = 3.41$, $p = 0.009$; relaxation: $t = 5.27$, $p = 0.002$). There were some group differences: Johrei showed trends in anger ($t = 2.19$, $p = 0.06$), depression ($t = 2.03$, $p = 0.077$) and vigour ($t = 2.13$, $p = 0.066$). Hypnosis and the relaxation control groups showed significant deterioration in depression ($t = 3.72$ and 4.15, $p = 0.005$ and 0.006) and vigour (4.40 and 4.39; $p = 0.002$ and 0.005). With hypnosis there was an increase in anger ($t = 2.46$, $p = 0.036$) and in the relaxation control group a trend in anger ($t = 1.96$, $p = 0.098$) and an increase in confusion ($t = 4.42$, $p = 0.004$).

Baseline versus examination

The STAI results are shown in Table 2, where those with exams in either of the two post-training assessments were grouped, as were those without exams. The ANOVA showed that there was a significant increase in state anxiety (F = 11.02, df = 1,32, $p < 0.002$), without a change in trait anxiety (F = 0.007). Multiple comparisons showed that the increases in state anxiety were reliable in the hypnosis ($t = 3.30$, df = 12, $p < 0.006$) and control groups ($t = 2.63$, df = 9, $p < 0.027$) and did not reach significance in the Johrei group ($t = 1.11$). The increase in state anxiety in the controls was significantly greater than in the Johrei group (LSD = 8.6, $p = 0.049$).

With regard to the POMS, difference scores between baseline and exams are shown in Figure 3 for the various subscales. The total score means are shown in Tables 1 and 2. There was an increase in POMS total distress with exams (F = 6.938, df = 1,32, $p < 0.013$) and a weak tendency for an interaction between session and group

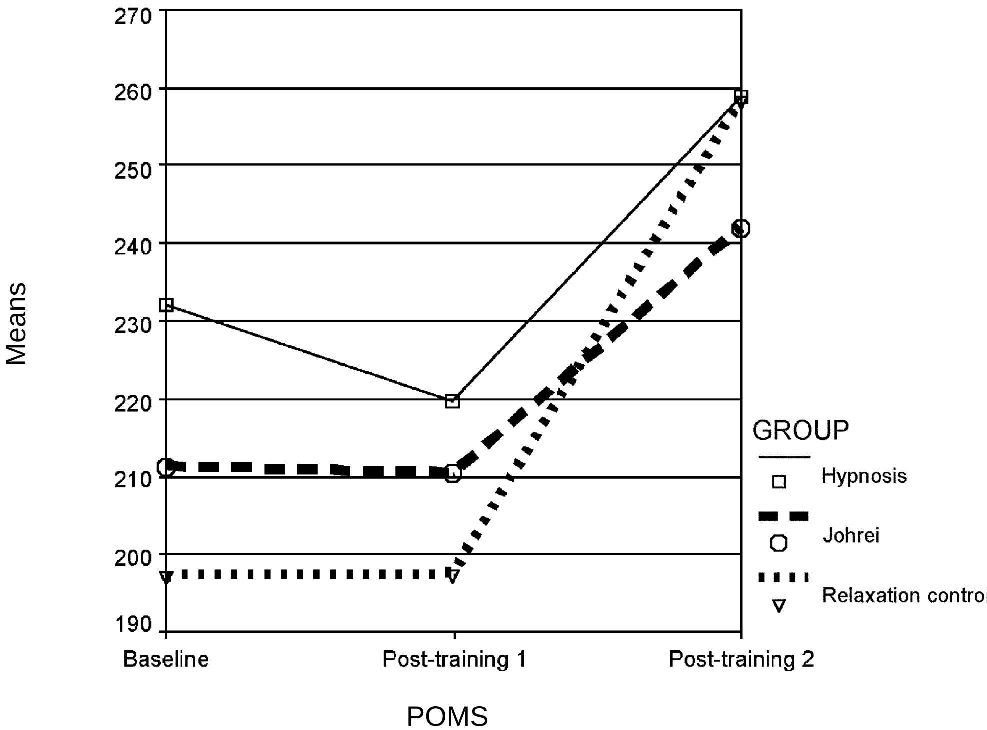

Figure 2. POMS total distress scores over time.

(F = 2.3589, df = 2,32, p <0.11). Figure 3 depicts the changes in POMS subscales. Increases were seen in the subscale tension (combined, F (1,32) = 28.20, p = 0.000; hypnosis, t (12) = 3.42, p = 0.005; Johrei, t (11) = 2.23, p = 0.048; relaxation control, t (9) = 3.56, p = 0.006). While there was also an increase overall in depression (F = 6.77, df = 1,32, p <0.014) and a trend towards a decrease in vigour (F = 3.51, df = 1,32, p <0.07), in both cases these were attributable to the control group (depression, t = 4.29, p<0.019; vigour, t = 2.95, p<0.016), which was also responsible for the elevation in the POMS total score (t = 3.37, p < 0.008); comparisons within the treatment groups were non-significant (t = 0.12 to 0.94). In ratings of confusion there was an interaction between session and group (F (2,32) = 3.09, p = 0.059), also attributable to increased confusion in the control group (t (9) = 2.85, p = 0.019).

Exams at different intervals from training

The STAI means are shown in Table 2. There were significant differences between proximal and distant exam sessions, all showing increases in distress for those in the distant session: STAI total score (t = 4.69; p < 0.001), state anxiety (t = 4.91; p < 0.001), trait anxiety (t = 2.79; p < 0.009). In contrast when the non-exam post-training sessions were compared, there were no significant differences between the two times of assessment (STAI: t = 0.73, state anxiety: t = 0.21, trait anxiety: t = 0.16).

POMS: as with anxiety, there were significant differences in distress ratings between the two exam times in POMS total scores (t = 4.45; p < 0.001) and for five of six POMS subscales; means shown in Tables 1 and 2. All forms of distress except loss

Table 2. Mean scores for mood and anxiety variables at either post-training assessment points when the subjects had exams or no exams.

	Mean exams	(sd)	Mean non-exams	(sd)
Hypnosis	n = 13		n = 13	
STAI total	80.2	10.0	75.1	14.5
State	42.2	5.7	37.7	7.4
Trait	37.9	7.1	37.4	7.9
POMS total	242.2	40.4	233.3	39.1
Tension	62.0	9.2	59.6	7.8
Anger	64.4	8.6	63.8	11.2
Vigour	61.1	6.6	65.8	9.2
Confusion	58.6	6.4	56.5	7.6
Depression	62.7	9.5	61.5	7.0
Fatigue	55.7	8.4	57.7	11.2
PSS	24.5	7.1	21.2	7.2
Johrei	n = 12		n = 10	
STAI total	77.6	12.8	76.5	17.7
State	39.0	9.0	37.7	10.9
Trait	38.6	5.9	38.8	8.2
POMS total	227.7	15.9	231.7	36.7
Tension	61.8	7.3	56.7	8.2
Anger	58.6	5.3	62.9	8.6
Vigour	62.2	5.1	62.7	6.7
Confusion	60.1	7.4	53.9	7.0
Depression	58.2	5.2	60.6	9.1
Fatigue	51.3	5.4	60.3	6.0
PSS	21.8	6.8	21.9	8.7
Relaxation	n = 11		n = 12	
STAI total	73.2	17.2	74.7	15.7
State	37.5	9.9	38.4	10.7
Trait	35.6	8.4	34.4	7.8
POMS total	235.0	42.2	212.8	38.7
Tension	60.0	11.8	52.9	8.9
Anger	59.5	7.7	59.1	9.1
Vigour	55.6	19.1	65.3	7.1
Confusion	56.4	6.4	52.8	7.5
Depression	60.4	7.1	57.3	7.7
Fatigue	54.5	9.1	56.1	6.8
PSS	26.3	6.7	26.6	10.1

of vigour were significantly higher for those in the more distant exam situation (t = 2.12 to 5.42, p = 0.02 to 0.001). However, when exams were not approaching and POMS scales were compared, there were no significant differences (t = 0.147 to –1.76).

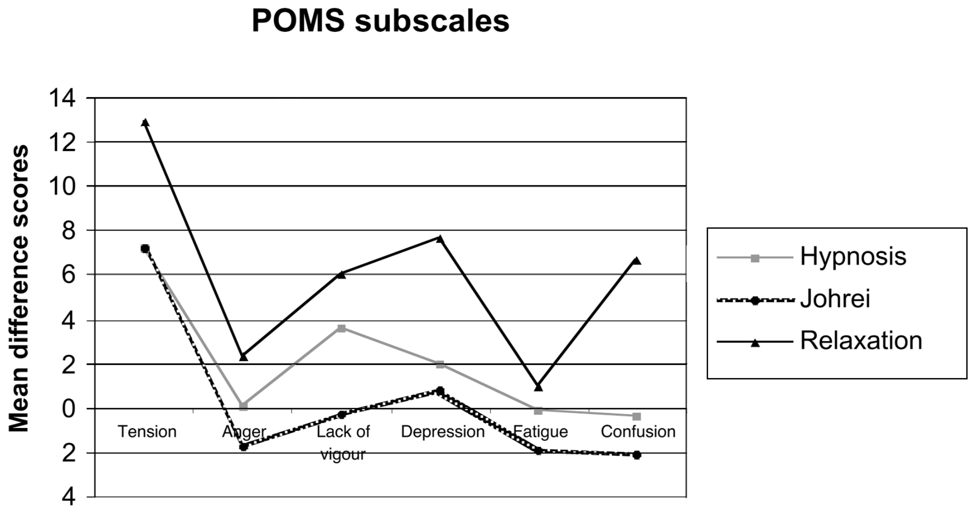

Figure 3. Changes in POMS subscales from baseline to exams. Positive scores are indicative of an increase in the subscales at the time of exams compared to baseline. In the case of vigour, the positive score is indicative of a decrease in vigour in the exam condition.

Diary mood valence

PEI Diary mood was examined by averaging the diary data over the first week compared to the fourth to sixth weeks. There were no group differences at baseline (Fs < 0.90). Post-training there was an improvement in mood for both positivity (session, F = 4.98, df = 1,33, p <0.033) and negativity (F = 4.18, df = 1,33, p < 0.049). Summation of the scales indicated a session effect (F = 7.35, df = 1,33, P < 0.011) with a tendency towards an interaction with group (F = 2.82, df = 2,33, p <0.074). As can be seen in Table 1, there was a decrease in negative mood in the hypnosis group (t = 3.02, df = 13, p < 0.01), and an increase in positive mood (t = 2.348, df = 13, p<0.035) with a total mood rating much improved (t = 3.2, p = .007). No significant changes (t <1.55, p >0.16) were found with the relaxation control and Johrei groups.

PSS

Perceived stress was measured at the assessment points of post-training 1 and post-training 2. Although the Johrei group was less stressed by post-training 2, and the hypnosis group maintained and the relaxation increased their PSS stress levels, these changes were not significant.

Beliefs

After the intervention, the student participants were asked whether they had come into the study with a belief in the efficacy of the method they were about to learn. This question was followed by the question of whether, now that they had experienced their particular intervention, it did actually work. Results are shown in Figure 4 for belief scores before and after the interventions. There were many changes of opinion and no correlations between the two judgements (Spearman's rho = 0.11).

As can be seen in Table 3, there were also no correlations between belief scores either before or after the intervention and the change scores of mood variables at session 2 or at exam time for the participants as a whole, or when analysed separately, in the hypnosis and the relaxation control groups. Using a significance criterion of $p < 0.01$, Johrei had two significant correlations with beliefs after the intervention, that of changes in state anxiety from baseline to post-training ($r = 0.632$, $p = 0.009$) and tension at the time of exams ($r = 0.79$, $p = 0.004$) suggesting that there may be a relationship of anxiety levels affecting beliefs. This is further exemplified by noting that those who thought their intervention did not work had a net increase in anxiety as measured by the post-training state anxiety difference scores (Johrei: 3.64; relaxation: 0.83) whereas those who thought it did work had a net decrease in anxiety (Johrei: –5.2, $t = 2.34$, $p = 0.035$; relaxation: –5.5, $t = 1.91$, $p = 0.085$). This occurrence was not observed in the hypnosis group, and not in the group as a whole. However, the strongest association appears to be with the measures of absorption and hypnotizability. Those who thought their intervention did not work had a mean absorption score that was 10.1 points lower than those who thought it worked ($t = 3.73$, $p = 0.001$). None of these associations occurred as a result of beliefs held before the study, but was associated to what appears to be a reaction to experiences they had with their interventions.

Absorption

No TAS variables in any group using $p < 0.01$ as a criterion predicted changes post-intervention in STAI scores, POMS scores, exam STAI or exam POMS. There was a significant correlation between the TAS and beliefs after the intervention (rho = 0.504, $p < 0.001$) overall. In the hypnosis group, the TAS was only weakly correlated with beliefs (rho = 0.445, $p = 0.09$), but was significantly correlated with beliefs after the intervention in the Johrei group (rho = 0.629, $p = 0.009$) and in the relaxation group (rho = 0.786, $p = 0.001$).

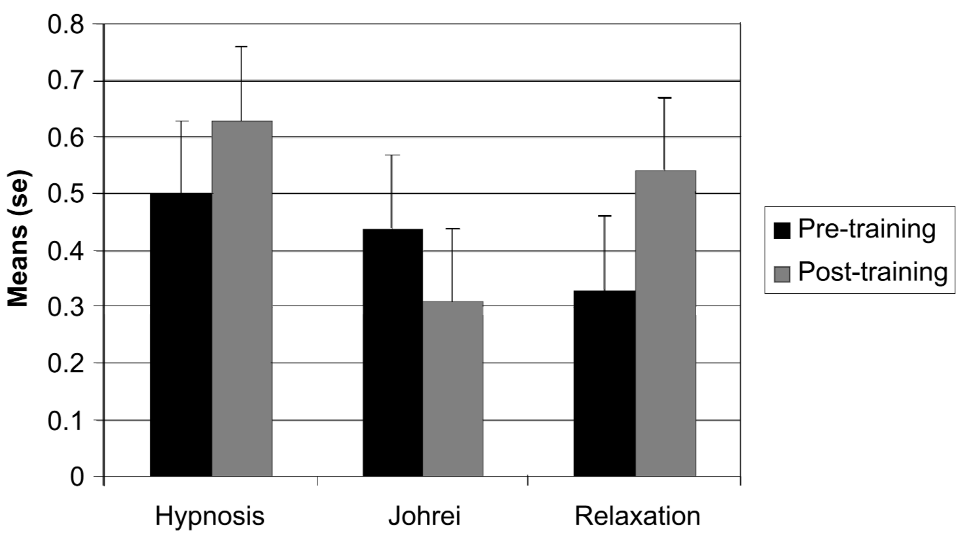

Figure 4. Subjects gave a yes or no answer to the question of whether they thought their particular intervention will work ('pre-training') or has worked ('post-training').

Table 3. Spearman rhos showing few correlations between anxiety and total distress (POMS) scores

	Hypnosis		Johrei		Relaxation	
	Before	After	Before	After	Before	After
State (post)	0.38	0.17	0.18	–0.63*	–0.39	–0.27
State (exam)	0.04	–0.57	–0.37	–0.62	0.22	0.56
Trait (post)	0.32	0.28	0.34	–0.50	0.06	–0.41
Trait (exam)	–0.04	0.08	–0.17	–0.62	–0.48	0.64
STAI (post)	0.26	0.20	0.44	–0.59	–0.32	–0.53
STAI (exam)	0.10	–0.21	–0.07	–0.56	–0.04	0.80
POMS (post)	–0.05	–0.24	0.21	0.00	–0.26	0.31
POMS (exam)	0.02	–0.49	–0.37	–0.60	–0.21	0.76*
Diary (post)	–0.02	–0.09	0.22	–0.26	0.00	–0.27

* < 0.01.

Discussion

The study provided clear evidence that examinations acted as a real life stressor, which on this occasion was discernible over and above other life vicissitudes, including being a student in a demanding course of study, not always the case in empirical studies using exams as an ecological stressor (see Gruzelier et al., 2001a, b for review). Here exam stress was evident whatever had been the type of psychological intervention.

Considering first the results of the three groups after the formal month of training at post-training session 1, there did appear to be preferential benefits to the self-hypnosis and Johrei groups over the relaxation control group which experienced a mock neuro-feedback protocol. This protocol in a previous study had shown beneficial effects as measured by Thayer activation and deactivation self-report ratings (Egner et al., 2002). These effects included reductions in arousal and tension equivalent to an authentic neurofeedback relaxation protocol used for optimizing functions that include music performance.

Here the control group was at a disadvantage compared with the self-hypnosis and Johrei groups. There was a greater increase in state anxiety measured with the Speilberger scale signifying anxiety at the time of the rating, and there was an increase in trait anxiety, interpreted as anxiety over the past few days, and which, on average, fell in the self-hypnosis and Johrei groups leading to significant differences in comparisons with the control group. There were also increases in the controls in tension and depression on the POMS not seen in the other groups. These increases in negative mood in controls may possibly be due to abnormally low levels of distress on the particular day they were measured at baseline. From an alternative point of view, these increases occurred despite the fact that their levels of distress were significantly lower prior to training than in the other groups.

After the first post-training assessment there was no further neurofeedback training in the control group whereas in the hypnosis and Johrei groups home practice continued, albeit in the majority practice tapered off. Here there was clear evidence of elevation in distress in all groups, but on many measures this was more marked in the relaxation controls compared with those receiving hypnosis and Johrei. This was seen in state anxiety, POMS total distress, depression, confusion and loss of vigour.

In examining whether the interventions were helpful in moderating the effects of exam stress, all groups showed an increase in tension with exams. However, Johrei was effective in buffering the effects of exam stress on state anxiety to a greater extent than in both the control and hypnosis groups. Otherwise both hypnosis and Johrei were successful in buffering the effects of stress on vigour, depression and confusion, all of which became more problematic in the relaxation control group as was the total level of distress (POMS total). Benefits were sustained at follow-up when practice was reduced by those participants not engaged in exams. However, benefits were not sustained when exams were scheduled at follow-up.

The study was deliberately designed for stringency with a control group that itself included elements of expectancies and relaxation. Moreover, many studies have used relaxation as its intervention showing improvement in mood and up-regulation of various immune parameters (for example, Kiecolt-Glaser, Garner, Speicher et al., 1985; Burns et al., 2001). Accordingly differences on the mood variables between this somewhat elaborate relaxation control group and either of the intervention groups may be illustrating legitimate modifications that should not directly be attributable to the placebo response or the commonality of relaxation in the three interventions.

It is noteworthy that the advantages to Johrei and hypnosis occurred mostly independently of the beliefs the students disclosed about the efficacy of treatment, other than a tendency in the Johrei group for an association between increasing anxiety and a decline in their beliefs. More importantly, however, beliefs correlated with absorption scores, not before the intervention, but after training. An intriguing possibility is that the interventions provided an opportunity to become absorbed, and this ability to respond subsequently was the basis for their belief that the intervention 'worked'. Absorption scores correlated with few changes in mood. Therefore, the sensation of the process of absorption may have triggered the belief.

In providing the first scientific test of the efficacy of the Japanese Johrei method we can conclude that Johrei was as effective as self-hypnosis training on most measures in benefiting mood in the face of a severe life stressor. There were some indications that Johrei may have subtle superiorities that require further examination such as reducing anxiety, depression and anger. Other papers from this study that are in preparation examine the immunological and electroencephalographic measures, with some indication that there are differences in response to Johrei training from both the self-hypnosis and relaxation control groups. Variables include enhanced natural killer cell activity and increased EEG power in illustrating more activating as distinct from relaxing effects. Johrei has strong agential aspects including involvement in both administering and receiving, as well as its active visualization component. These activities may contribute to its beneficial effects given that in studies of hypnosis active imagery was found to be superior to passive imagery for immune up-regulation and health (Gruzelier et al., 2001a). Participants with a cognitively activated personality also show preferential effects on immune up-regulation and health (Gruzelier et al., 2001b; Gruzelier, 2002a; Gruzelier, 2002b).

Self-hypnosis disclosed advantages over Johrei and the relaxation control groups in the daily recording of mood in the diary data, examined during weeks four to six. These showed that those practising hypnosis were generally more positive in mood by then, which was close to the completion of their self-hypnosis training when they were still practising their technique about once a day. The usual problems of maintaining diaries with increasing pressures of exams and end of year activities resulted in a lack of useful data beyond that point.

In summary, it was found that, as a result of both Johrei and hypnosis, participants generally coped better emotionally with exams than the control group, even though there appeared to be a fall-off in both practice and effectiveness of the interventions with the second scheduling of exams. A month of self-hypnosis and Johrei training was more effective than the relaxation control procedure in reducing in students' levels of anxiety, depression and tension. This occurred even through the control group by virtue of a quirk of randomization started the study with lower levels of negative affect on virtually all of the scales including trait anxiety. As a first examination of the efficacy of Johrei on mood the results support its benefits in university students with strong commitment to Western medicine and science and who were in the main sceptical about its potential influence. A fuller picture will be provided by completion of neurophysiological and immunological parameters currently in progress and obtained concurrently. These may be examined in the knowledge of the evidence here of demonstrable benefits on self-reported mood scales.

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Address for correspondence:
Dr TM Laidlaw
Department of Cognitive Neuroscience and Behaviour
Imperial College London
St Dunstan's Road,
London, W6 8RF, UK