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Music performance anxiety: A clinical outcome study into the effects of cognitive hypnotherapy and eye movement desensitisation and reprocessing in advanced pianists

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Abstract

Numerous investigations into music performance anxiety have focused on the conscious mind. However, little research has focused on implicit processes for alleviation of this condition. Cognitive hypnotherapy (CH) and eye movement desensitisation and reprocessing (EMDR), therapies which target implicit processes, were investigated in an intervention study with advanced pianists ($n = 46$). Participants were of mixed gender aged 18–26 years (three over 30) and were randomly assigned to a therapy or control group. The therapy groups received two interventions of either CH or EMDR during a two-week period between two concerts. Quantitative data were collected through performance assessment, the Spielberger State-Trait Anxiety Inventory and a self-report questionnaire (SRQ). The SRQ and a log of performance experience also allowed for qualitative assessment. Results showed that both therapy groups (but not the control) experienced a significant reduction in state anxiety post therapy and a significant improvement in performance. Trait anxiety decreased significantly below baseline levels post intervention in the EMDR group. This is an important area for future research in music psychology and has broader implications in other fields.

Keywords

cognition, implicit processes, intervention, state anxiety, trait anxiety

Cognitive anxiety is a psychological problem, the causes of which can be deeply embedded in the unconscious mind (Alladin, 2010). It exerts a negative effect on human behaviour, including music performance; the research literature validates this extensively (Kenny, 2011; Kirchner,

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2003; Osborne, Kenny, & Cooksey, 2007). Music performance anxiety (MPA) is widespread, affecting musicians of any age, instrument, amateur and professional musicians alike (Kenny, 2011) and over 60% of performing musicians experience this sometime during their lifetime (Wesner, Noyes, & Davis, 1990). Females generally exhibit higher degrees of MPA than males (Osborne & Franklin, 2002; Wesner et al., 1990) and solo performance generates higher levels of MPA than ensemble (Brugués, 2011). Music performance anxiety has been widely investigated; however, the problem still persists (Chan, 2011; Huang, 2011; Plaut, 1998; Shoup, 1995; Sloboda & Juslin, 2001; Williamon, Aufegger, & Eiholzer, 2014; Xu, 2010).

The components of anxiety

Performance anxiety lies within the broad domain of social anxiety, occurring when psychological discomfort in situation-dependent states leads to anxiety (Crozier & Alden, 2005). A model of anxiety proposed by Lang, Miller, and Levin (1988) demonstrated that the combination and interplay of three factors – cognitive, physiological and behavioural – appear to be responsible for anxiety. Lang et al. (1988) maintained that anxiety is the interaction of fearful thoughts, arousal of the autonomic nervous system, and overt behavioural responses to perceived threat. Cognitive anxiety was first categorised into a two-factor structure having both trait and state components (Cattell, 1956). Traits are developed in early life and reflect residues of earlier memories that may no longer be in conscious awareness (Kemp, 1996; LeDoux, 1996). Trait anxiety is responsible for up to 25% of the variance of subjective anxiety experienced during music performance (Lehrer, Goldman, & Strommen, 1990) and for individuals with high trait anxiety performance can be impaired (Spence & Spence, 1996). Differences in trait levels affect an individual's response in threatening situations intensifying the state component of anxiety (Spielberger, 1966). Faulty information which triggers affective negative responses is primarily the cause of state anxiety (Beck & Clarke, 1997; Mandler, 1984) and may originate from various cognitive processes including: high levels of trait (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983); historical or social factors causing negative conditions (Sloboda & Juslin, 2001); aspects of behaviour which are pre-conscious (LeDoux, 1989); explicit memories of past events (Wills, 2009); and implicit memories no longer in conscious awareness (Damasio, 1989; Scherer, 1993).

Implicit and explicit memories can trigger latent patterns of thoughts, emotions and behaviour that maintain and exacerbate non-helpful behaviour (Young, Klosko, & Weishaar, 2003). Sloboda and Juslin (2001) posit that emotional feelings and memories may exert a crucial role in instigating and exacerbating the anxiety experienced prior to and during a music performance.

Cognitive arousal and performance. Cognitive arousal and performance quality are thought to be interrelated in that the degree of arousal experienced before and during performance directly affects performance quality (Craske & Craig, 1984). A theoretical model proposed by Wilson (2002) grouped cognitive interference into three categories: intrapersonal, situational and the degree of task mastery.

a) Trait anxiety: personality characteristics
b) State anxiety: situational stress, environmental pressures
c) Task mastery: complexity and preparedness

Different theories have been suggested regarding the degree of arousal appropriate in performance in respect of optimal functioning (Hanin, 1986), memory (Salmon, 1990),

Table 1. Interventions offered for the treatment of music performance anxiety.

Cognitive interventions	Assertiveness training, attentional focus techniques
Cognitive behavioural interventions	Exposure therapy, systematic desensitisation, systematic rehearsal, coping skills, imagery and goal setting
Physiological and physically-based interventions	Alexander technique, biofeedback, muscle relaxation and music-enhanced relaxation
Meditative interventions	Meditation, yoga and autogenic training
Psychodynamic interventions	Cognitive hypnotherapy, eye movement desensitisation and reprocessing

concentration and memory (Wilson & Roland, 2002), attentional focus (Mather et al., 2006), catastrophising (Hardy & Parfitt, 1991), state/trait anxiety (Spielberger et al., 1983), and task mastery (Kokotsaki & Davidson, 2003). Peer pressure and audience effect are further factors affecting arousal (Craske & Craig, 1984). However, although high levels of anxiety in performance can be detrimental (Taylor, 1956), A-State (state anxiety) is thought to have motivational or drive properties giving the optimal level of arousal leading to peak performance (Wilson & Roland, 2002).

Positive effects have been reported in the cognitive therapies; however a large number of sessions are required (Osborne et al., 2007; Tarrant & Leathem, 2007). Core problems are not treated and the relapse rate for individuals who have undergone symptom-based cognitive behavioural treatment is cause for concern (Kenny, 2011). The physiologically/physically-based treatments and assertiveness training demonstrate little beneficial effect; however, meditative (meditation and yoga) and dynamic psychotherapy show more promising outcomes (Kenny, Arthey, & Abbass, 2014). Table 1 documents the therapies adopted.

At present there is little research using therapies that target implicit or automated mental processes (thoughts and actions no longer consciously perceived) for the reduction of MPA. The aim of this research is the alleviation of the multi-dimensional aspects of MPA investigating the potential benefits of cognitive hypnotherapy (CH) and eye movement desensitisation and reprocessing (EMDR). No previous study has compared these interventions for the reduction of MPA; therefore the decision to combine these two therapies in a single study allows for scientific comparability. The rationale is that, by focusing on the role that automated cognitive processes exert in exacerbating MPA, both therapies have the potential to reduce anxiety quickly and effectively. The protocols and procedures are designed to desensitise and reprocess dysfunctional cognitions, emotions and memories from past and present trauma. Hypnotherapy changes the memory and meaning of distressing events by reducing the perception of threat, and also the somatic symptoms of anxiety associated with the event (Dozois & Westra, 2004). Hypnosis dates back over 220 years as an area of scientific research and clinical practice (Barnier & Nash, 2008) and is used to bring about positive change in a wide variety of psychological conditions.

Eye movement desensitisation and reprocessing, used initially in the treatment of post-traumatic stress disorder (Shapiro, 1989), has expanded widely, treating a wide range of pathologies including anxiety disorders and associative conditions. In 2004 it was placed in the "A" category for the treatment of trauma and anxiety-related conditions by both the American Psychiatric Association and the American Department of Defense (American Psychiatric Association, 2004).

Previous research in areas other than MPA is referenced below:

Hypnotherapy: acute stress (Bryant, Moulds, Guthrie, & Nixon, 2005), depression (Alladin & Alibhai, 2007), PTSD (Abramowitz, Barak, Ben-Avi, & Knobler, 2008), headaches and migraines (Hammond, 2007), performance anxiety (Schoenberger, 2000; Schoenberger, Kirsch, Gearan, Montgomery, & Pastyrmak, 1997).

EMDR: anxiety disorders (Sack, Lempa, Steinmetz, Lamprecht, & Hofmann, 2008), the influence of trauma on performance (Swart, 2009), performance anxiety in acting (Arditi, 2009), sports performance (Oglesby, 1999), and athletic performance enhancement (Gracheck, 2011).

Studies have provided evidence for the effectiveness of EMDR for both "A" category and small trauma (Högberg et al., 2007, 2008; Kemp, Drummond, & McDermott, 2010).

Existing CH and EMDR studies for MPA

Two pilot studies using hypnotherapy were conducted with musicians suffering from MPA (Plott, 1987; Stanton, 1993) and extended in a large-scale study when Stanton (1994) paired pianists according to their scores on the Performance Anxiety Inventory (PAI; Nagel, Himle, & Papsdorf, 1981). One of each pair was assigned either two sessions of hypnotherapy or to a non-treatment condition. The hypnotherapy group (but not the control) showed a significant reduction in MPA immediately after treatment which was still evident six months later. The current research is the only substantial study in more than two decades which has investigated hypnotherapy for MPA.

Although little research has been conducted into the effects of EMDR in the field, it was beneficial in reducing anxiety in singers regarding idiosyncrasies in the subjective vocal range (Feener, 2005). This research was extended when Plummer (2007) focused on maladaptive memories of situational-states in brass players and found that EMDR was helpful in changing dysfunctional memories.

The present study builds on the investigations of Feener (2005), Plummer (2007), and (Stanton, 1994). It tests MPA across three different domains – cognitive, physiological/somatic and behavioural – and draws on the three-systems model of Lang et al. (1988) testing 46 advanced pianists pre, during and post solo performance focusing on cognitive anxiety. (In this report somatic anxiety refers to the physiological components of anxiety.) It asks the overarching research question: "What is the effect of psychotherapeutic interventions on levels of state and trait anxiety and quality of performance in advanced pianists?" and tests the hypotheses that:

1. Participants will report significantly higher levels of state anxiety prior to and during the first performance than at the second performance post intervention.
2. Self-perceived cognitive anxiety will be significantly higher preceding intervention and at the first performance than in the post-intervention performance.
3. Post intervention, participants will self-report a reduction in somatic symptoms of anxiety during the second performance compared to the first.
4. Participants will report lower levels of trait anxiety post intervention at the second performance in comparison to the first performance.
5. Pianists will obtain significantly higher outcome scores in performance evaluation post therapy.
6. Both therapies, CH and EMDR, will be equally effective in reducing MPA and enhancing performance outcome.

Research questions in this study focus on these hypotheses.

Method

Aim and objectives

The aim was to investigate and compare the efficacy of two psychodynamic interventions, CH and EMDR, on MPA when applied to advanced pianists performing in two small concerts. The objective aimed to contribute to theories of optimal arousal (in relation to assessment of performance quality) and the role of cognitive anxiety in relation to state/trait anxiety. A further objective was to put forward a theoretical model of the interactions of cognitive anxiety, performance quality and psychodynamic interventions in the light of this research, thus building on previous literature.

Participants

Forty-six advanced pianists were recruited from three higher educational institutions, volunteering after responding to flyers and presentations of the research: 27 females, 16 males (aged 18–26 years); two females, one male (aged 33, 48 and 53 years). It was not necessary that piano was their main instrument, or that they were music specialists, but a criterion was that they suffered from MPA (self-evaluated). Eight held post-graduate diplomas in piano and 38 were of Grade 8 standard of the Associated Board of the Royal Schools of Music (ABRSM). All participants completed an informed consent form and anonymity was provided.

Overall research design and structure

The study was conducted over a period of 18 months and utilised two tranches (Tranche 1: 21 participants; Tranche 2: 25 participants). A multi-modal repeated-measure design was adopted using both a nomothetic and an idiographic approach. The emphasis was on quantitative data which were supplemented by qualitative information on subjective cognitive anxiety. Three different measures of anxiety which adhered to the procedures of a randomised pre-test/post-test three-group investigation were adopted using CH, EMDR and a control group. The investigation comprised three key stages for each tranche, testing the effects of cognitive anxiety at baseline and in two closed performances (pre and post intervention).

Materials and measures

A quantitative assessment of cognitive anxiety was conducted at baseline and prior to performances 1 and 2 (P1 and P2) through the State-Trait Anxiety Inventory (STAI Y-1 and Y-2; Spielberger et al., 1983). A quantitative measurement of performance quality was applied pre and post intervention across the three groups at P1 and P2. A self-report questionnaire (SRQ) designed by the author allowed for both quantitative and qualitative assessment of MPA through idiographic reports of each performance experience.

Performance assessment

The performance assessment sheet used the following six criteria based on the ABRSM categories for performance assessment, each marked on a Likert-type scale of 1–10 where 1 represented the lowest mark and 10 the highest:

overall accuracy/technical security

instrumental control (including pedal)

fluency

sensitivity to tonal quality

musical interpretation

confidence in performance

The performances were assessed by the author and two independent professional musicians (from higher education institutions) from the audio recordings. To limit the potential of bias during the performances, an administrator (not connected to the research) operated the audio recorder and randomly chose the order of playing of the participants. At the second performance before playing began, the researcher left the room as at this time it was known which experimental condition each participant had been assigned. All audio recordings were assessed blind, with tracks in a random order of first and second performances and no participant numbers. The administrator held details of track numbers and corresponding participants which were only revealed after completion of evaluation by the three assessors. The main researcher evaluated the whole sample (92 performances) and the independent assessors evaluated a random sample of 22.

Self-report questionnaire (SRQ)

The rationale for not using a standardised instrument of testing was based on the need to determine subjective experiences and maladaptive thought processes throughout the research period and during two specific performance situations, not wholly fulfilled by existing measures. The psychometric properties of this new instrument were constructed to allow for measurement of cognitive anxiety (trait and state) as well as feelings/emotions, somatic symptoms, and the outcome of dysfunctional processes on the performance itself. Content analysis was used in evaluating the detailed information received from participants' comments in each of the six categories below:

What were your thoughts/feelings/emotions during the days/weeks leading up to the performance?

Did your feelings stay the same/grow stronger/grow weaker as the concert approached?

Did you ever feel so strongly that you felt you might withdraw?

How did you feel 15/30 minutes before performing at the venue?

Did you experience any physical symptoms before or during your performance? If yes, what were they? To what degree?

Did they improve or adversely affect your performance in any way?

A qualitative evaluation of the subjective comments on the SRQs was conducted, assessed as indicative of low, medium or high anxiety and quantified using a Likert-type scale of 1–9 where 1 represented the lowest anxiety and 9 the highest (1–3 low anxiety, 4–6 medium, 7–9 high). A blind assessment of a random sample of SRQs from P1 and P2 was conducted by an

independent assessor. The SRQ allowed for statistical analysis of subjective anxiety to supplement the findings from the STAI Y-1, the state portion of the STAI questionnaire.

To ensure objectivity, after completion of the SRQs an administrator not involved in the research in any way concealed the participant numbers on the SRQs using removable opaque adhesive tape, and the questionnaires were photocopied to prevent removal of the tape during the assessment process. The photocopies were used by the main researcher and the independent assessor for evaluation of the comments. Following this process the tape was removed from the original questionnaires to enable the statistical tests to be conducted. The main researcher evaluated the whole sample, and a sample of 20 questionnaires was independently assessed by an experienced musician.

The therapeutic intervention

At the commencement of session one in both CH and EMDR, the subjective narrative "life history" is related to the therapist. In therapy, narrative smoothing gives greater understanding of the emotional experience and gives the individual more control over the story, leading to psychological wellbeing (Schafer, 1978). Hypnotherapy includes establishing rapport, explanation of the therapeutic process and goal setting. After trance induction, negative cognitions are desensitised and positive visualisation introduced, altering the unhelpful behaviour pattern and bringing positive change. Eye movement desensitisation and reprocessing adopts certain protocols and procedures using an adaptive information processing (AIP) model incorporating an eight-phase treatment which uses bilateral stimulation as the means of desensitising maladaptive processing (Shapiro & Forrest, 1997). During treatment the feared situation is imagined (as in virtual reality), emotions, negative cognitions and body sensations are subjectively rated on a Likert-type scale, where 10 represents the highest disturbance and 1 the lowest. When the target is at the lowest disturbance, the positive cognition is installed enabling cognitive and emotional re-experiencing of the former uncomfortable situation.

As this research was self-funded the therapies were conducted by the author, a qualified and experienced hypnotherapist and EMDR practitioner.

Procedure

The procedure for assessing the anxiety of participants and evaluating performance in both Tranches 1 and 2 is summarised in Table 2.

Summary of analysis procedure

This clinical outcome study investigated the effects of two sessions of either CH or EMDR on MPA. The baseline data (STAI Y-1, Y-2) was analysed at the three measurement points (baseline, P1, and P2) to assess changes in state and trait anxiety levels. Self-reported anxiety was investigated through a subjective assessment questionnaire (SRQ) completed by participants at P1 and P2. The SRQ as a new measurement of assessment of cognitive anxiety was reported in relation to validated tests. An independent investigation of performance outcome was also conducted at P1 and P2.

Levels of change were assessed on two fronts:

1. Four ANCOVAs were used to assess the effects of the therapies in the total sample which indicated the main effect of time. In addition a paired samples *t*-test assessed the

Table 2. Assessment procedure.

Timescale	Procedure
Baseline	Measurements of cognitive anxiety taken at recruitment (STAI Y-1 and Y-2)
Performance 1 (pre-intervention phase)	STAI Y-1 and Y-2 completed (15 minutes pre-performance) Unpublicised, audio-recorded concert. Participants play in random order an own-choice piece appropriate to their standard from memory or score; length two minutes. Completion of SRQ (immediately post performance) Random allocation to CH, EMDR or control groups (immediately post performance)
Intervening two weeks between performances	The therapy groups receive two one-hour therapy sessions of their allotted therapy
Performance 2 (post-intervention phase)	Performance 1 measures repeated (except allocation to groups) Blind evaluation of performance quality conducted by assessors for both performances

relationship between state and somatic anxiety in a small sample (five participants) who demonstrated the highest cognitive anxiety at P1.

2. Pairwise comparison tests of variance were utilised to assess and identify subgroups which demonstrated the greatest significant difference post intervention over time.

Results

Preliminary analysis

A mixed-model ANOVA was calculated (STAI Y-1) at baseline and P1 to assess differences in state anxiety across the three institutions and showed no significant differences at these measurement points ($p = .349$). A Kolmogorov-Smirnov (K-S) test (STAI Y-2) was conducted at baseline to establish the distribution of trait anxiety across all participants ($N = 46$, $M = 44.52$, $SD = 8.578$, $p = .448$) which showed a normal distribution.

Three Pearson's correlation tests were applied testing:

1. State and trait anxiety at baseline (STAI Y-1 and Y-2), $r(46) = 0.403$, $p = .005$. This indicates a positive correlation, supporting Spielberger et al. (1983).
2. State anxiety (STAI Y-1) and self-perceived anxiety (SRQ) at P1, $r(46) = 0.582$, $p < .001$. The results suggest a strong correlation between the validated test (STAI Y-1) and the new measurement (SRQ).
3. State anxiety (STAI Y-1) and number of somatic symptoms (SRQ) at P1, $r(46) = 0.496$, $p < .001$. The results demonstrated that levels of cognitive anxiety co-varied positively with decreased somatic anxiety and support the findings of Craske and Craig (1984) and Hardy and Parfitt (1991).

Gender differences

To assess the comparability of gender differences in state anxiety a *t*-test was calculated at baseline and P1 (STAI Y-1). A significant difference was found [$t(45) = 2.89$, $p = .006$] indicating

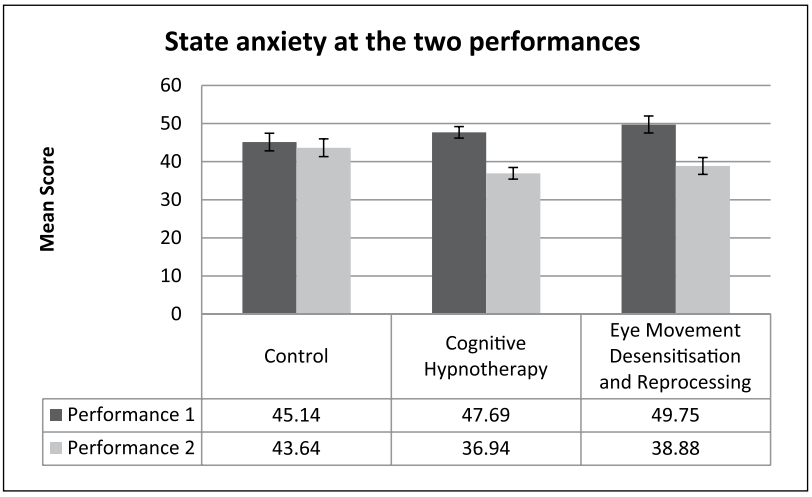

Figure 1. The distribution of the scores and standard error of the means of state anxiety (STAI Y-1) 15 minutes prior to P1 and P2.
Note. Error bars show 95% CI of mean.

that females were significantly more anxious than males at the first performance. These findings support Osborne and Franklin (2002) and Wesner et al. (1990).

Main analysis: Cognitive anxiety (STAI Y-1)

Hypothesis 1: participants will report significantly higher levels of state anxiety (STAI Y-1) prior to and during the first performance than at the second performance post intervention.

Hypothesis 6: both therapies, CH and EMDR, will be equally effective in reducing MPA and enhancing performance outcome.

Cognitive anxiety was not evenly spread throughout the groups and ranged across low, medium and high levels (STAI Y-1). An ANCOVA was conducted across the whole group testing state anxiety at P1 and P2 15 minutes prior to each performance. There was a main effect of condition, $F(2, 42) = 4.916$, $p = .012$, which showed an overall significant difference of mean anxiety across the groups at the second performance (see Figure 1). Planned contrast tests with a Bonferroni correction revealed significant decreases in state anxiety in the therapy groups compared to the Control: CH, $p = .005$, 95% CI [12.87, 2.43]; EMDR, $p = .017$, 95% CI [11.76, 1.19]. The CH and EMDR groups did not differ significantly ($p = .641$) showing that change occurred equally in both therapy groups. Hypotheses 1 and 6 are therefore supported.

Self-perceived anxiety (SRQ)

Hypothesis 2: self-perceived cognitive anxiety will be significantly higher preceding intervention and at the first performance than in the post-intervention performance.

An Intraclass Correlation Coefficient was conducted of the raw scores of the two assessors at P1 and P2 [ICC (2, 2k) = 0.867, $N = 10$, $p < .001$] which showed a high level of agreement. Further data analysis was conducted across the three groups at P1 and P2. An ANCOVA

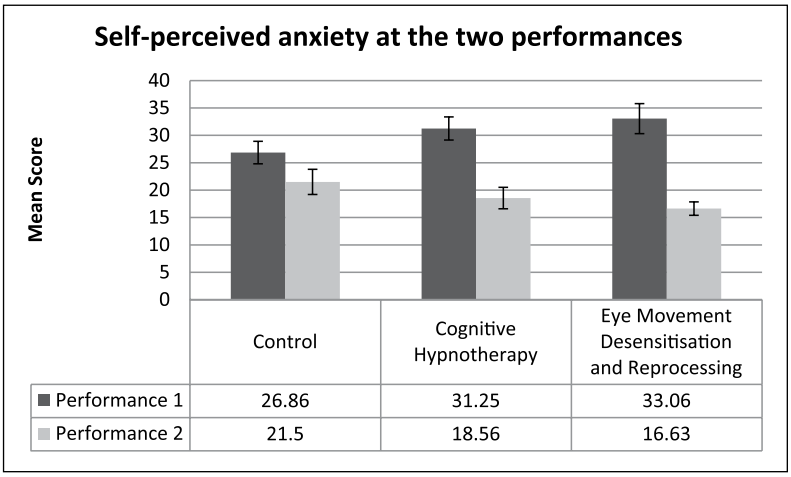

Figure 2. Self-perceived anxiety across the three groups assessed from self-report questionnaire comments completed at the end of P1 and P2.
Note. Error bars show 95% CI of mean.

revealed a main effect of condition [$F(2, 42) = 4.11$, $p = .023$] which showed an overall significant difference in means at P1 and P2 (see Figure 2). To assess the impact of the therapies across the groups, Contrast results (K Matrix) were conducted: Control and CH, $p = .072$, 95% CI [9.39, −.42]; Control and EMDR, $p = .007$, 95% CI [12.06, 2.06]; CH and EMDR, $p = .272$, 95% CI [7.24, −2.09]. No significant differences were found between Control and CH, and CH and EMDR; however, a significant difference was found between Control and EMDR, indicating that although both therapies were effective in reducing self-perceived anxiety, EMDR was the more effective therapy. Hypothesis 2 is therefore only partially supported.

Somatic symptoms: Self-report SRQ

Hypothesis 3: post intervention, participants will self-report a reduction in somatic symptoms of anxiety during the second performance compared to the first.

Somatic symptoms experienced immediately prior to and during the first performance (SRQ) were various – nervousness, tension, shaking (hands/feet), sweating, loss of control, cloudy vision, butterflies and nausea – supporting Brooker (2009, 2012), Craske and Craig (1984), Shoup (1995), and Steptoe (2001). Symptoms of dissociation (feelings of unreality), cognitive perceptual disruption (misreading the score), and negative thoughts anticipating failure overlapped with somatic symptoms in some cases.

An ANCOVA demonstrated no significant difference overall in somatic anxiety between P1 and P2: $F(2, 42) = 2.34$, $p = .109$. However, in the main, participants displayed fewer somatic symptoms at P2 supporting Hypothesis 3. A paired samples t-test of those participants with the highest cognitive anxiety at P1 (STAI Y-1) showed a significant decrease in somatic symptoms across the two performances: mean difference 2.60, $t = 6.50$, $p = .003$. Table 3 displays the raw data of the five participants with the highest STAI Y-1 scores (of 60 and above) at P1, within a possible range of 20–80. The changed cognitive scores between P1 and P2 are given, together with the number of somatic symptoms experienced at each performance. It should be noted

Table 3. Cognitive and somatic levels of anxiety at P1 and P2.

Participants and groups	STAI Y-1 state anxiety cognitive scores		Number of somatic symptoms	
	Perf 1	Perf 2	Perf 1	Perf 2
MS65 CH	75	43 (–32)	4	1
MS3 EMDR	64	47 (–17)	3	1
MS69 EMDR	61	37 (–24)	6	2
MS14 Control	60	31 (–29)	2	0
MS66 EMDR	60	46 (–14)	3	1

Note. Cognitive Anxiety: 15 minutes prior to performance 1 taken from STAI Y-1; 15 minutes prior to performance 2 taken from STAI Y-1 (and change in scores).

that in the absence of therapy MS14 experienced large decreases in state anxiety and no somatic symptoms at P2 (see Discussion section).

Trait anxiety

Hypothesis 4: participants will report lower levels of trait anxiety post intervention at the second performance in comparison to the first performance.

A Pearson's correlation was applied at baseline, P1 and P2 to establish the degree of association between the test scores: baseline [$r(46) = 0.806$, $p < .001$]; P1 [$r(46) = 0.837$, $p < .001$]; P2 [$r(46) = 0.793$, $p < .001$]. This indicates a positive correlation between the three conditions, P1 having the highest correlation and P2 the lowest. An ANCOVA tested the impact of the therapies overall across the groups at baseline, P1 and P2 (dependent variable P2, co-variates baseline and P1). There was a main effect of condition, $F(2, 41) = 6.84$, $p = .003$, demonstrating an overall significant difference in the mean at P2 in comparison with baseline and P1: baseline [$F(1, 41) = 11.62$, $p = .001$]; P1 [$F(1, 41) = 20.53$, $p < .001$] (see Figure 3). Pairwise comparisons of the groups were conducted – Control and CH ($p = .943$, 95% CI [4.70, −3.12]); Control and EMDR ($p = .005$, 95% CI [9.18, 1.34]); CH and EMDR ($p = .015$, 95% CI [−.76, −8.25]) – showing that the EMDR group was significantly less anxious than the CH and Control groups at P2. Hypothesis 4 is therefore supported. The significant decrease in the EMDR group is considered further in the discussion section.

Assessment of performance

Hypothesis 5: pianists will obtain significantly higher outcome scores in performance evaluation post therapy.

A preliminary analysis of the raw scores of the three assessors was conducted at P1 and P2 [ICC(2, 3k) = 0.953, $N = 11$, $p < .001$] which showed excellent agreement between the scores. To establish if a relationship exists between state anxiety and performance outcome, a Pearson's correlation was conducted at P2 using the two variables: state anxiety (STAI Y-1) and performance assessment scores. The results [$r(46) = -0.350$, $p = .017$] demonstrated that as anxiety decreased so performance outcome increased. Performance improved in all groups at P2. However, to analyse the changes across the three groups an ANCOVA was calculated using the six assessment criteria at P1 and P2. There was a main effect of condition,

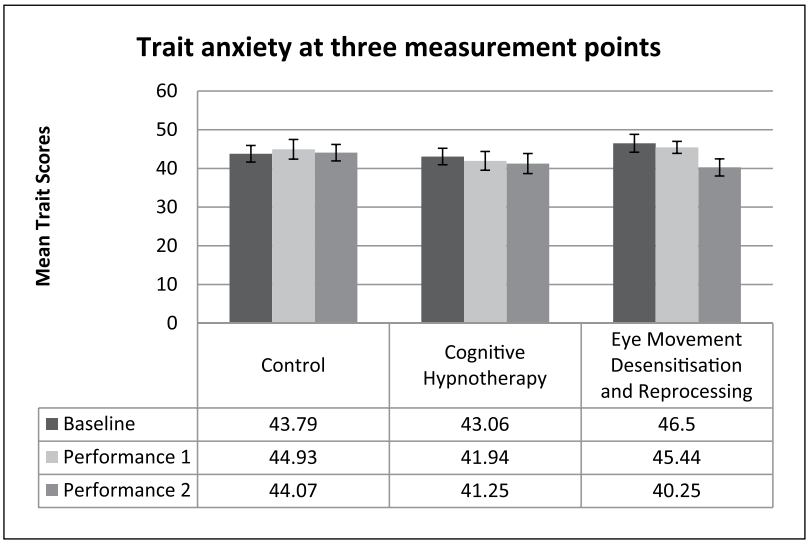

Figure 3. The standard error of the means of trait anxiety from the STAI Y-2 questionnaire taken at baseline and 15 minutes prior to P1 and P2.
Note. Error bars show 95% CI of mean.

$F(2, 42) = 4.07$, $p = .024$, demonstrating a significant improvement in the quality of playing overall at the second performance. To establish the interaction between group, time and performance outcome, pairwise comparisons of the means showed a significant improvement in the CH and EMDR groups at P2 compared to the Control: Control and CH ($p = .012$, 95% CI [−.91, −6.90]); Control and EMDR ($p = .022$, 95% CI [−.53, −6.41]). No significant differences were found between the two therapy groups ($p = .751$) indicating that both therapy groups were equally effective in significantly enhancing piano performance thus supporting Hypotheses 5 and 6. It should be noted that the control group also improved at P2 and this will be referred to in the discussion. A comparative analysis of the average scores of three different aspects of performance at P1 and P2 indicated that at P2 fluency increased by 14%, confidence in performance by 12%, and overall accuracy by 10%. Figure 4 shows the enhancement in performance across the groups post intervention.

Discussion

This clinical outcome study is the first to compare two psychotherapies, CH and EMDR, for the reduction of MPA. It was found that levels of state anxiety significantly decreased in the therapy groups post intervention at the second performance (STAI Y-1) after two therapy sessions and that both therapies were equally effective in achieving this, supporting Hypotheses 1 and 6. This research corroborates the findings from key studies conducted into MPA using hypnotherapy (Stanton, 1994) and EMDR (Feener, 2005; Plummer, 2007) where a reduction in MPA and enhancement of performance were achieved. On the question of trait anxiety the therapy groups demonstrated lower levels at P2, post intervention, in comparison to P1, thus supporting Hypothesis 4. However, it was found that EMDR significantly reduced trait anxiety at this point of measurement compared to the other groups. Eye movement desensitisation and reprocessing is a psychotherapy aimed at the pivotal event/trauma that caused the initial fear/reaction; it also

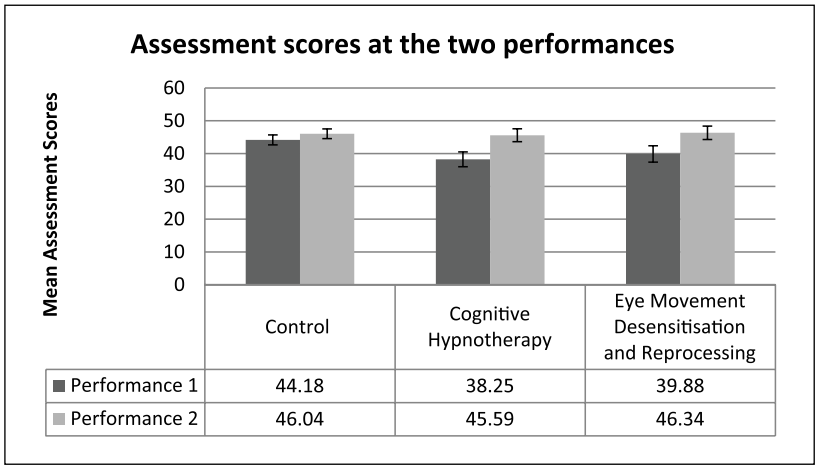

Figure 4. The standard error of the means of performance quality at P1 and P2.
Note. Error bars show 95% CI of mean.

addresses the contemporary stimuli that might independently trigger the subjective fear (Luber, 2009). In a large group of musicians a significant number may have deep-rooted psychological issues regarding performance. Therefore further research could explore EMDR with musicians who have experienced trauma in areas other than performance. This will help to identify the interconnection of trauma and trait anxiety and to ascertain whether the modification or extinction of dysfunctional memories can exert a positive impact on MPA. It has been argued that implicit/emotional processes produce an automatic response occurring outside conscious awareness at a sub-cortical level, producing a fast, involuntary and autonomic response to fear (Dvorak-Bertsch, Curtin, Rubinstein, & Newman, 2007). Therefore it is further recommended that research is undertaken into the interrelationship of trait and state anxiety and their role in subjective performance, using therapies which focus on automated processes.

On the question of SRQs, a rich source of idiographic information was provided on the phenomenology of MPA not possible from the STAI Y-1 alone. Participants self-reported that anxiety could begin weeks before the performance and grow stronger as the performance approached. The importance of adopting both a nomothetic and an idiographic approach in investigative studies has been argued (Barlow & Nock, 2009). It was hypothesised in the current study that both therapies would be effective in significantly decreasing self-perceived anxiety at P2. However, this was only supported in part as statistical analysis of the SRQs demonstrated that the EMDR group were significantly less anxious than both the CH and control groups at this measurement point. This could be attributed to the fact that EMDR specifically targets past negative experiences and changes the negative perceptions associated with the trauma. Seven participants (15%) had thought strongly of withdrawing, indicating high levels of subjective negative perceptions of the forthcoming event, supporting Kenny's research into MPA (2011). In the current research cognitive anxiety (STAI Y-1) co-varied positively with decreased somatic anxiety, showing the interrelationship of these two systems, adding to theoretical contributions into MPA and corroborating Landers and Lochbaum's (1998) research into anxiety in the field of sports psychology. In the current investigation somatic anxiety was reduced at P2 in comparison to P1 (supporting Hypothesis 3) but overall there was no significant effect. However, a significant difference was found in both cognitive anxiety (STAI Y-1) and somatic anxiety (SRQ) in participants with the

highest cognitive anxiety at these measurement points. In the overall sample a "floor effect" may be operating, as participants with low cognitive anxiety also experienced fewer somatic symptoms at both performances compared to participants with high cognitive anxiety. It has been argued that lack of concentration is a symptom of MPA (Craske & Craig, 1984; Steptoe, 2001). This study found that concentration was negatively affected and MPA heightened by audience distraction, but further found that audience support could enhance feelings of security, resulting in reduced anxiety, supporting McPherson and Schubert (2004). A participant demonstrating a high cognitive score at P1 and multiple somatic symptoms (see Table 3) experienced large decreases in both cognitive and somatic anxiety at P2 in the absence of therapy. Self-report questionnaire comments at P1 were "I was very nervous, like I would mess up the whole piece". At P2 "I felt much more secure with supportive friends there". The feelings of greater security experienced appeared to impact positively on cognitive and somatic anxiety.

Performance. In performance, state and trait anxiety (STAI Y-1 and Y-2) responded positively to therapeutic change, state anxiety significantly in both the CH and EMDR groups, and trait anxiety in the EMDR group. This translated into more effective playing evidenced by the audio recordings, relating to enhanced tonal quality, musical interpretation, overall accuracy, technical security and instrumental control. Cognitive appraisal of the performance experience after two therapy sessions had changed perceptions positively in the treatment groups. However, in the absence of therapy the control group also improved at P2. Previous studies have reported that when the threat is revisited, where all conditions are the same cognitions are somewhat desensitised (Connolly & Williamon, 2004). Barlow (2002) argues that how events are perceived and interpreted may determine the type and intensity of the emotional response. At P1 lack of preparation was a factor which appeared to heighten anxiety and led to catastrophising, supporting Hardy, Beattie, and Woodman (2007). Kirchner (2003) argues that maladaptive thought processes and behaviour are activated by a threatening performance and can be changed by therapeutic treatment; this is supported by the present study. Participants, however, performed in two small concerts which should be taken into account when interpreting the findings: with a large audience the results may have been different. However, the subjective degree of cognitive arousal post intervention at P2 translated into significantly higher performance scores in the therapy groups, thus supporting Hypotheses 5 and 6 posed earlier in the study.

The current research is the first to compare two interventions which focus on automated processes for the reduction of MPA and optimum performance. It demonstrates the interaction of cognitive, physiological and somatic factors to perceived threat and the impact they exert on performance, supporting Lang et al.'s theory (1988). More specifically, the current investigation supports Wilson's theoretical model of anxiety (2002) regarding the role of state and trait anxiety in exacerbating arousal in performance. The findings highlight the importance of implicit processes in the maintenance of MPA. It further demonstrates that cognitive anxiety, arousal and quality of performance are positively changed in a short space of time when therapies which focus on automated processes are adopted for the alleviation of MPA. Therefore the author suggests that theoretical models of arousal and optimum performance should now incorporate both explicit and implicit processes for the alleviation of this psychological condition. The relevance of the therapies adopted in the current research for the reduction of MPA add to theories of cognitive arousal and optimum performance and contribute to existing knowledge in the field.

Limitations. A weakness of this research was having the main researcher as the sole therapist. However, the main researcher was self-funded and therefore employing independent therapists

was not feasible. Future studies could broaden the design by using therapists not involved in data collection. However, the use of several therapists may make this research more robust but it introduces variables regarding personalities and the therapist–participant relationship. Measures were taken to mitigate the effects of bias in this study through blind assessment of the self-report questionnaires and performance recording at all measurement points.

Conclusion

This study has highlighted a number of important issues, particularly the role that trait anxiety plays in performance, and should serve as a prompt for future research. The findings suggest that CH and EMDR have an important contribution to make to the understanding and treatment of MPA, demonstrating the effectiveness of automated processes in significantly both decreasing MPA and enhancing performance. It is an original contribution to research and has called into question the current literature in the field. However, additional validation is required through further rigorous investigations. Clinical outcome studies should now be undertaken comparing therapies which focus on implicit processes with those that concentrate on explicit processes in order to assess effectiveness and number of sessions required. Further to this a comparison of the cost-effectiveness of hypnotherapy and EMDR with that of the standard practice (currently cognitive behavioural therapy) should be undertaken given the effectiveness of these therapies after two sessions.

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