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TITLE: Sports Confidence and Critical Incident Intensity After a Brief Application of Emotional Freedom Techniques: A Pilot Study

RUNNING HEAD: Sports Confidence and Critical Incident Intensity After EFT

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Abstract

Purpose: To determine whether a single session of Emotional Freedom Techniques (EFT) could reduce the emotional impact of traumatic memories related to sports performance and lead to increased confidence levels in athletes.

Background: A relationship has been noted in other studies between sports performance and psychological factors such as confidence and anxiety levels. Critical incidents, which are experienced as traumatic memories, are associated with increased levels of psychological distress across a variety of symptom domains. Brief EFT sessions have been demonstrated to improve sports performance and reduce anxiety.

Methods: Female college athletes ($N = 10$) with traumatic memories were assessed on three self-reports and one objective measure (pulse rate). Subjective measures were the State Sport Confidence Inventory, Subjective Units of Distress (SUD), and the Critical Sport Incident Recall (CSIR) questionnaire, which measured both emotional and physical forms of distress. Subjects received a single 20-min EFT session. Baseline values were obtained, as well as pre-, post-, and 60-day follow-ups.

Results: Significant post-intervention improvements were found in SUD, for both emotional and physical components of CSIR, and for performance confidence levels ($p = .001$). The change in pulse rate was marginally significant ($p = .087$). All participant gains were maintained on follow-up.

Conclusions: EFT may increase sport confidence levels by reducing the emotional and physical distress associated with the recall of critical incidents.

Applications in Sport: A brief application of EFT employed immediately prior to competition may increase confidence and mediate anxiety.

Keywords: sport, confidence, pulse, EFT, Emotional Freedom Techniques, anxiety, memory

Introduction

Research investigating the linkage between psychological factors and sports performance reveals complicated relationships among anxiety, stress, self-confidence, and achievement. Although researchers have observed significantly higher levels of confidence alongside lower levels of cognitive and somatic anxiety in elite versus non-elite athletes (1,2) (e.g., Kim, Chung, Park, & Shin, 2009; Robazza & Bortoli, 2003) or even within the same athlete in practice versus competition (3) (e.g., McKay, Selig, Carlson, & Morris, 1997), predicting performance based on variations in those measures has proven more difficult.

Findings on the relationship between self-confidence and performance have been more consistent, with reports of high self-confidence predicting high performance among a variety of athletes. These include young female gymnasts (4,5) (Jones, Swain, & Hardy, 1993; Tsopani, Dallas, & Skordilis, 2011), high school long-distance runners (6) (Martin & Gill, 1991), singles tennis players (7) (Filaire, Alix, Ferrand, & Verger, 2009), and baseball players (8) (Kimbrough, DeBolt, & Balkin, 2007). Research into the predictive power of anxiety on performance has yielded less stable results, however. Jones et al. (1993), (4) for example, found no significant differences between the somatic anxiety ratings given by high- and low-performing gymnasts; and Sanchez, Boschker, and Llewellyn (2010) (9) actually found an inverse relationship: that higher levels of pre-competition somatic anxiety in elite male climbers were related to higher performance during competition. Whether somatic anxiety improves or harms athletic performance may depend on athletes' perceptions of their anxiety, that is, whether they regard it as something more likely to be facilitative or debilitative of performance (4,10) (Jones et al., 1993; Raglin 1992). Anxiety is also mediated by whether the athlete is competing in a team or individual sport (11) (Hanton, Jones, & Mullen, 2000), the perceived level of support provided by a coach (12) (Ryska & Yin, 1999), and whether the setting is at the athletes' home venue (13)

(Jamieson, 2010).

This summary of findings suggests that athletes seeking mental conditioning in an effort to improve their performance in sport should look to methods with the potential to maximize their self-confidence while diminishing the effects of anxiety (or reorienting the athlete to perceive this anxiety, particularly somatic anxiety, as facilitative toward performance). Interventions designed to target these psychological factors have ranged from relaxation-based techniques to cognitive-behavioral therapy (CBT), and reviews have found them efficacious (14,15) (Meyers, Whelan, & Murphy, 1996; Weinberg & Comar, 1994). It is worth noting, however, that many of the therapeutic interventions under examination involved numerous treatment sessions. Two studies on CBT to improve vertical jump height and free throw percentage in basketball players prescribed anywhere from 6 to 12 hours of treatment (16,17) (Hamilton & Fremouw, 1985; Kearns & Crossman, 1992)—which while useful as part of an athlete's long-term training regimen is hardly an expedient method for use in high-pressure, competitive situations. The ideal therapy for these situations would be brief, economical, reliable, and easy to administer or self-administer.

These characteristics have led to increased use by athletes of Emotional Freedom Techniques (EFT). Developed by Craig (18)(2008), and referred to elsewhere as "acupressure assisted psychotherapy" (19)(Lane, 2009, p. 40), this psychophysiological intervention pairs exposure to a traumatic memory with a cognitive element involving self-acceptance. To these established methods it adds a somatic element, in the form of stimulating 12 specific points on the body. These locations are regarded in traditional Chinese medicine as the endpoints of acupuncture meridians. The EFT client provides a self-assessment of the degree of emotional distress before and after stimulating these points with the fingertips, and repeats the process until the distress is reduced. The protocol can be performed in less than a minute.

Published studies have found evidence for the efficacy of EFT in the long-term reduction of psychological distress (20,21) (Rowe, 2005; Palmer-Hoffman & Brooks, 2011). EFT has been tested for a range of psychological conditions including phobias (22-24) (Wells, Polglase, Andrews, Carrington, & Baker, 2003; Salas, Rowe, & Brooks, 2011; Baker & Siegel, 2011), posttraumatic stress disorder (PTSD) (25-28) (Karatzias et. al., 2011, Church, Piña, Reategui, & Brooks, 2012; Church, 2009a; Church, Geronilla, & Dinter, 2009; Church et. al., 2009), test anxiety (29,30) (Benor, Ledger, Touissant, Hett, & Zaccaro, 2009; Sezgin & Özcan, 2009), and physical symptoms (31,32) (Brattberg, 2008; Hodge & Jurgens, 2011). EFT remains effective when delivered as an online intervention (31) (Brattberg, 2008) and when adapted to a group format (33)(Church & Brooks, 2010).

To investigate the physiological mechanisms of action of EFT, Church, Yount & Brooks (34) (2012) undertook a randomized controlled trial measuring the cortisol levels of 83 participants before and after an hour-long intervention. Cortisol was selected as a target since it is a multi-systemic endocrine hormone, regulating many of the body's stress-response systems. Pre- and post cortisol levels were measured for three groups: the first group received EFT coaching; the second group received a supportive interview by a therapist, while the third group rested. The study found that psychological symptoms such as anxiety and depression were significantly improved after EFT when compared to the other two groups, and that cortisol declined significantly ($p < .03$). Anxiety in the EFT group declined by 58% ($p < .05$). The improvement in psychological symptoms was significantly associated with the decline in cortisol, indicating a simultaneous psychological and physiological effect for EFT.

The potential for use of EFT in sports psychology became apparent due to press reports over the last decade began to note its increasing popularity among baseball, soccer, and basketball players, and among golfers (35-37) (Achenbach, 2006; Bachman, 2007; Rowe, 2009), though evidence for its effects on performance were largely anecdotal until Church (38) (2009b) undertook a randomized controlled trial to study its impact on free throw performance and jump height in elite (i.e., Division 1 college) basketball players. Church compared a 15-min EFT intervention with a placebo treatment delivered to performance-matched men's and women's basketball teams. He found that following a 15-min EFT intervention, players' free throw percentages improved significantly. In a subsequent critique and re-analysis of Church, Baker (39) (2010) argued that Church understated the effect of EFT due to the ceiling effect: players with perfect scores could not improve more whether they were in the control or experimental groups. By re-analyzing results for the lowest-scoring athletes, Baker found that low-performing players improved disproportionately. A second randomized controlled trial measured EFTs efficacy at improving soccer free kick performance when compared to a placebo, and also found significant improvement (40) (Llewellyn, in press).

The present study sets aside the question of performance outcome to look at the impact of EFT on athletes' levels of confidence and distress. It seeks to elucidate the psychological mechanisms underlying the positive association between EFT and improved athletic performance by examining EFT's potential for increasing confidence and reducing anxiety. We expected that these outcomes would be evidenced in changes in both psychological measures, via self-reported levels of confidence and distress, and physiological measures, via recordings of participants' pulse rates.

Method

Participants

Participants were members of a women's university volleyball team. Permission was obtained from the university's ethics committee to conduct the study, and all participants signed informed consent forms. Eleven potential participants were initially assessed for inclusion in the study. The only exclusionary criterion was a score of less than 3 on a Likert scale (ranging from 0 = *minimal distress* to 10 = *maximum distress*) that assessed participants' distress when asked to recall either an emotionally troubling memory in which their "team did not win" or their "worst experience with a coach."

One potential participant was excluded based on this criterion. The data analysis is therefore based on the recordings for the remaining 10 women. Participants ranged in age from 18 to 21, with a mean age of 19. All had obtained academic scholarships based on their sports abilities, and 8 had obtained Most Valued Player status. They had played volleyball prior to the study for periods ranging from 6 to 11 years, with a mean value of 9 years, and reported playing between 0 and 6 other sports, with a mean value of 2 other sports.

Design and Intervention

Participants completed the Subjective Units of Distress (SUD) scale, the State Sport Confidence Inventory (SSCI), and the Critical Sport Incident Recall Survey (CSIR). Assessments were performed at the following intervals: 30 days pre-intervention, 15 days pre-intervention, immediately pre-, immediately post-, and 60 days post-intervention. Participants' pulse rates were also measured at these same intervals. Measures are described in detail below. Participants were competing with other teams throughout the assessment period.

The intervention, delivered by a certified EFT practitioner, consisted of a 20-min EFT session with each athlete individually. Under the practitioner's direction, each participant paired her description of the traumatic memory (i.e., of her team not winning or of her worst experience with a coach) with a statement of acceptance: for example, "Even though I'm angry that my coach embarrassed me by yelling at me in front of the entire team, I fully and completely accept myself." The practitioner or participant then activated the somatic component of the intervention by tapping on the prescribed acupoints (for a thorough description of the EFT tapping sequence and acupoints, see Church, (39) 2009a). After the 20-min session was complete, the participant provided another SUD score.

Measures

Subjective Units of Distress. SUD uses an 11-point Likert scale ranging from 0 (*minimal distress*) to 10 (*maximum distress*) to assess the emotional impact of critical incidents (42) (Wolpe, 1973). Increased SUD has been found to be associated with heightened arousal of the sympathetic nervous system (43) (Thyer, Papsdorf, Davis, & Vallecorsa, 1984). SUD also correlates with heart rate, respiratory rate, and galvanic skin response (44) (Scheeringa, Zeanah, Myers, & Putnam, 2004). When interventions lower SUD, physiological signs of stress are also reversed (45) (Wilson, Silver, Covi, & Foster, 1996).

State Sport Confidence Inventory. The SSCI is a validated instrument that asks the question "How confident are you right now about competing in the upcoming contests?" across 13 categories (46) (Vealey, 1986). For each category, athletes report their confidence level on a scale from 1 (*low confidence*) to 8 (*high confidence*). The SSCI is designed to measure confidence levels at a defined point in time, such as prior to a future series of athletic events, and relative to "the most self-confident athlete" the participant knows.

Critical Sport Incident Recall Survey. The CSIR was developed for this study by the second author (47) (Downs, 2005), as a means of assessing PTSD symptoms in athletes, after a literature search determined a lack of suitable validated assessments. It measures emotional distress (ECSIR) and physical distress (PCSIR) associated with the recall of a critical incident. It has 16 questions, scored by participants on a scale from 0 (*very comfortable*) to 4 (*very distressed*).

Pulse rate. Participants' pulse rates were measured with the Instapulse 107 (Bio Sign Instruments, Champlain, NY). The Instapulse is a portable handheld device that measures electrocardiogram rhythm and displays a four-heartbeat average. We selected the Instapulse as one of the least invasive methods of obtaining pulse rate values. Athletes held the device for 30 seconds while at rest, and the mean of the values obtained was used in the study.

Statistical Analysis

We conducted paired *t* tests to compare the first and second pretests. One participant was missing the second pretest; therefore, we calculated a mean substitution (mean of the first and third pretest) for this participant. All *t* tests were nonsignificant; therefore an average of the two pretests was calculated and used in subsequent analyses (see Table 1).

A general linear models repeated measures analysis of variance was conducted on all dependent variables across four time points: average of the first two pretests, pretest immediately preceding the intervention, posttest, and follow-up. We then conducted post hoc paired *t* tests on all significant models. Because of the number of possible comparisons (6), we applied the Bonferroni correction, setting the alpha level to $p < .008$ for the paired *t* tests.

Results

The main effect for time was significant for SUDS, ECSIR, PCSIR, and SSCI ($p = .001$). Time was marginally significant in the model for pulse rate ($p = .087$). In the post hoc analyses, the pretest average was significantly higher than the posttest for SUDS, ECSIR, and PCSIR, suggesting an improvement in these variables. Similarly, the pretest average was lower than the posttest for SSCI, indicating an increase in sports confidence. The pretest average was also significantly different than the follow-up for all of the variables, including pulse rate, indicating maintenance of the improvements observed at the posttest. Similarly, the pretest immediately prior to the intervention was significantly different than the posttest and the follow-up for all variables, with the exception of the pulse rate, indicating an immediate improvement on these variables following the EFT intervention. There was no difference between the posttest and the follow-up for any of the dependent variables. Change data are displayed in Table 2.

These findings indicate an immediate positive effect of EFT on the SUDS rating, emotional and physical competition experience ratings (ECSIR, PCSIR), and sports confidence level (SSCI). However, there was no immediate effect on pulse rate. In addition, all significant changes were maintained at the follow-up, indicating maintenance of the effects observed immediately following the intervention. A decrease in the pulse rate was found at the follow-up. However, given that the decrease in pulse rate was nonsignificant immediately following the intervention, it is unclear whether the observed difference at the follow-up can be attributed to the intervention.

Discussion

The present study extends research by Church (39) (2009a) and Llewellyn (41) (in press) to show further evidence of the potential of EFT for use by athletes. Whereas Church's randomized controlled trial found significant improvement in basketball free throw performance, and Llewellyn found significant improvements in soccer free kicks, these were both outcome studies that did not attempt to investigate the psychological or physiological mechanisms of action of EFT. The current pilot study examines a number of plausible psychological mechanisms, and suggests that EFT can maximize athletes' confidence while reducing the distress they experience when recalling sport-related trauma. Furthermore, EFT's effects on confidence and distress were long-lasting, remaining significant even 60 days after application of the brief, 20-min intervention. A large effect size in a small population receiving a brief intervention is consistent with a robust treatment effect.

A limitation of the present study is its small sample size, though the use of *t* tests was designed to mitigate against individual variance. Replication is necessary in larger populations, with different sports and age groups, and with active control groups, before these results can be generalized. EFT's low cost, ease of use, and quick application, argue strongly for its further study.

We found only a marginally significant effect of EFT on athletes' pulse rates in this study, and therefore, although psychological measures supported the efficacy of EFT, our single physiological measure provided only limited support for our hypothesis. In their study of the effects of EFT on phobias, as measured by behavioral, self-report, and physiological measures, Wells et al. (2003) similarly found only marginally significant changes in participants' pulse rates. They noted, however, that this was not uncommon in the arena of behavioral interventions, which "tend to yield changes on physiological measures with less regularity than they do on behavioral and self-report measures" (48, 49) (citing Ost, 1991; Turpin, 1989).

A similar disparity between the size of physiological and psychological measures was found in the cortisol study (35) (Church, Yount, & Brooks, 2012). While both cortisol and psychological distress decreased significantly, a significant effect was noted in psychological measures after testing only 30 subjects. Almost three times that number were required to demonstrate significance on the physiological measure of cortisol. A replication of the present study with a larger N might similarly produce confirmatory data.

Additionally, pulse rate may be too imprecise a measure, since it is typified by rapid fluctuations. Church et al argue that salivary cortisol tests are a more sensitive physiological measure of stress, since cortisol levels adjust slowly relative to most other hormones and neurotransmitters. The circadian cycle of cortisol is stable month after month, and ultradian fluctuations are small. Salivary cortisol assays can elucidate the hormonal effects of EFT, and by extension its genetic effects as well, since the genes that code for cortisol must of necessity be expressed in order for cortisol levels to rise. For this reason, a review of the experimental evidence for EFT states that: "Exposure [and] acupoint treatments modulate, with unusual speed and power, gene expression for specific as well as systemic therapeutic gains," (50) (Feinstein & Church, 2010, p. 292). Not only does EFT therefore offer sports psychology a technique that is ripe for exploration; sports psychology offers energy psychology a fertile field for the further elucidation of its mechanisms.

Conclusion

Because of the complexity of relationships between psychological factors, such as confidence and anxiety, and athletic performance, the challenge for sports psychology is to find interventions that simultaneously improve athletes' confidence levels, reduce the stress of sport-related trauma, demonstrate efficacy in game-appropriate time frames, and yield measurable improvements in performance. Although a range of techniques has been assessed, few have demonstrated the results apparent in the preliminary research with EFT. This pilot study found significant improvements in confidence, reductions in the intensity of sport-related traumatic memories, and reductions in self-reported stress. Further research is required to determine whether these results can be replicated in a randomized controlled trial against an active treatment group, whether physiological measures correlate reliably with psychological improvement, and whether EFT demonstrates similar effects when tested with larger sample sizes.

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Table 1. Paired *t*-test results for first and second pretests.

Measure	**First pretest: *M* (*SD*)**	**Second pretest: *M* (*SD*)**	***t*(9)**	***p***
SUDS	6.10 (2.4)	6.00 (1.9)	0.25	.811
ECSIR	34.45 (8.0)	27.20 (5.8)	-1.0	.343
PCSIR	27.20 (5.8)	25.35 (6.3)	1.26	.240
SSCI	74.10 (21.6)	73.0 (19.8)	0.62	.550
Pulse	90.50 (13.4)	102.55 (15.4)	-2.05	.071

Note. SUDS = Subjective Units of Distress; ECSIR = emotional distress as measured on the Critical Sport Incident Recall (CSIR) survey; PCSIR = physical distress as measured on the CSIR; SSCI = State Sport Confidence Inventory.

Table 2. Change over time.

Measure	**Pretest average: *M* (*SD*)**	**Immediate pretest: *M* (*SD*)**	**Posttest: *M* (*SD*)**	**Follow-up: *M* (*SD*)**	***F*(3, 7)**	***p***
SUDS	6.05 (2.1)[a]	5.10 (2.4)[c]	0.70 (1.6)[b,d]	2.30 (1.7)[b,d]	28.73	.001
ECSIR	34.28 (8.0)[a]	27.40 (7.0)[c]	20.0 (8.8)[b,d]	19.80 (7.1)[b,d]	11.85	.001
PCSIR	26.28 (5.6)[a]	24.10 (7.2)[c]	16.70 (7.4)[b,d]	18.70 (7.1)[b,d]	11.55	.001
SSCI	73.55 (20.5)[a]	74.60 (20.3)[c]	90.70 (15.8)[b,d]	87.50 (21.5)[b,d]	10.38	.001
Pulse	96.53 (11.0)[e]	91.70 (21.5)	84.90 (13.8)	81.30 (9.0)[e]	2.43	.087

Note. Changes between scores denoted “a” and scores denoted “b” yielded reductions that were statistically significant at the $p < .003$ level; changes between scores denoted “c” and those denoted “d” yielded reductions that were statistically significant at the $p < .006$ level.
a > b $p < .003$; c > d $p < .006$; e > f $p = .002$.