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Psychological Effects of Massage on Running

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The effects of massage on psychological affect and on running-effort were studied in 30 women (*M* age = 20.83 yrs, *SD* = 1.23), from the English East Midlands, who were tested in two experimental test sessions, involving "pre-event massage" and flexibility (counterbalanced sessions), and a subsequent bout of exercise at self-selected workload. In the massage session the participants received massage for 10 min that was composed of light, rapid strokes to the legs and to the back by a qualified massage therapist. The flexibility session involved active stretching exercises for 10 min; both test sessions were followed by 20 min of running (or jogging). All participants completed two affect-

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measuring questionnaires pre- and post-exercise. Their perceived exertion and heart rates were recorded during the run. Results obtained by using repeated measures MANOVA and univariate ANOVAs indicated that massage enhanced positive affect ($p < .05$), lowered self-reported perceptions of physical symptoms ($p < .05$), and also decreased perceived physical effort ($p < .05$). These findings confirm the positive, and consequently motivational, impact of a brief massage session on exercise behavior.

Key Words: Athlete, Massage, Mood, Physical Activity, Wellness

A positive mindset is both favorable and necessary in most sport and exercise settings. People use numerous physical routines before their exercise or sporting competition. Some of these, like stretching and massage, may also contribute to positive mental states. For example, Parente (2000) showed that stretching was equally effective to a bout of aerobic exercise in improving mood and in decreasing anxiety. However, other scholars found no affective benefits resulting from stretching (e.g. Lox, McAuley, & Tucker, 1995). Similarly, some researchers found that massage induces positive affect and lowers state anxiety in clinical populations (e.g. Hasson, Arnetz, Jelveus, & Edelstam, 2004). In exercisers, however, the psychological effects of massage are not fully understood (Hilbert, Sforzo, & Swensen, 2003). Weerapong, Hume, and Kolt (2005) have recently articulated that to date only limited research have examined the effects of pre-event massage on exercise performance. However, they have described three possible psychophysiological pathways through which massage might affect exercise performance: (a) reduction of anxiety, (b) induction of relaxation, and (c) faster recovery from fatigue. While Weerapong et al. cite data supporting the three plausible explanations; the actual path or a theoretical model for these mechanisms is not provided.

One recent study (Micklewright, Griffin, Gladwell, & Beneke, 2005) using a within-participants research design, asked participants to perform a 30-second Wingate Anaerobic Cycling Test (WACT) after a 30-min rest period, as well as after a 30-min back massage. Mood states were measured three times: before and after rest and massage, as well as after the WACT. The results of the research yielded no significant findings in mood states after rest or massage, but the WACT performance was better following the massage session than after the rest session. These findings suggested that pre-event massage improves WACT, or anaerobic performance.

Micklewright et al.'s (2005) study is the only work (to the best knowledge of the authors) that has examined pre-exercise massage, and its anticipated psychological benefits, on subsequent performance. Furthermore, these authors tested the effects of massage on anaerobic rather than endurance performance. The aim of the current research was to compare the immediate psychological effects of stretching exercises and pre-event massage (Benjamin & Lamp, 1996) before a 20-min bout of running or an endurance exercise at self-selected workload.

It was hypothesized, that similar to Micklewright et al.'s (2005) results, facilitating effects of pre-event massage could also be observed after aerobic exercise. Further aims of this inquiry were to examine the effects of pre-event massage, in contrast to stretching, on subsequently self-selected exercise (running) workload, rated perceived exertion (RPE), and post-exercise affect in healthy female participants.

Method

A sample of 33 Caucasian women from the English East Midlands, all sport science student volunteers (Means: age = 20.83 yrs, *SD* = 1.23; height = 1.69 m, *SD* = 0.06; weight = 61.97 kg, *SD* = 8.02.), completed a within-participants study. Participants signed a written consent form and the APA guidelines for research with human participants (American Psychological Association, 2002) were followed during the course of the investigation. Participants came twice to a sports hall-annexed laboratory one week apart. In one of the two sessions, the volunteers received a 10-min pre-event massage, given by a qualified sport therapist who was qualified in pre-event sport massage. In the other session, they were asked to undertake 10 min of guided stretching that was also conducted by the therapist. The two experimental sessions were counterbalanced among the participants to account for possible order effects. Before and after both test sessions, the participants completed an affect-gauging well-being questionnaire (WBQ) that assessed positive affect (PA), negative affect (NA), and perceived physical symptoms (PS; Gauvin & Szabo, 1992). The items on this questionnaire were rated on a 7-point Likert scale. The questionnaire contains items such as depressed/blue (negative affect, 8 items), happy (positive affect, 6 items), or headache (physical symptoms, 10 items). The internal reliability of the three subscales is above .80.

After the stretching and the massage, the volunteers were asked to run for 20 min at a self-selected workload. During the run, the participants wore a Polar Electro heart monitor. At the 15th min mark into their exercise, participants were asked to indicate their RPE on Borg's (1985) scale, then to continue running for another 5 min. Within 5 min after the exercise, participants were asked to complete the brief Physical Activity Affect Scale (PAAS; Lox, Jackson, Wasley, & Treasure, 2000) which measures four states of affect: positive affect (PAFF), negative affect (NAFF), tranquility (TRNQ), and fatigue (FTIG). This 12-item scale is a hybrid of the Exercise Induced Feeling Inventory (EFI; Gauvin & Rejeski, 1993) and the Subjective Exercise Experience Scale (SEES; McAuley & Courneya, 1994), and it comes with good psychometric properties (Lox et al., 2000). The items are rated on a 5-point Likert scale, ranging from 0 to 4, used in rating words depicting affective states like calm, peaceful, or crummy. The internal reliability of the subscales is above 0.80.

Results

The psychological benefits of massage and stretching before running were compared by using a 2 (condition: stretching and massage) by 2 (period: before and after) repeated measures multivariate analysis of variance (MANOVA) with PA, NA, and PS being the dependent measures. This test yielded a statistically significant condition by period interaction, Wilks' Lambda = .730, $F(3, 27) = 3.33$, $p < .05$. To further examine which of the three dependent measures contributed to the multivariate interaction, univariate repeated measures ANOVAs were performed. Through these tests it was revealed that PA and PS, but not NA, responses yielded statistically significant interactions, $F(1, 29) = 7.6$, $p < .05$ for PA, and $F(1, 29) = 6.1$, $p < .05$ for PS. The increase in PA was statistically significant after massage, $t(29) = 3.8$, $p < .01$, effect size $d = .45$, but no significant change was noted following the stretching session. Although PS were higher before massage than before stretching (Period 1), the difference was statistically not significant. However, PS decreased significantly following both massage and

stretching, $t(29) = 4.8$, $p < .05$, $d = .53$, and $t(29) = 3.0$, $p < .05$, $d = .24$, respectively. These interactions are illustrated in Figure 1.

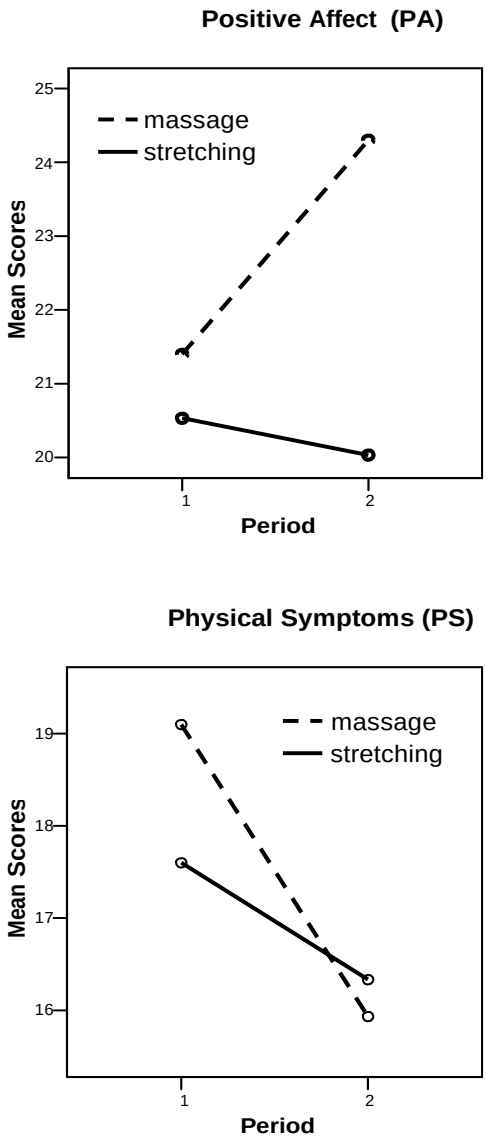

Figure 1. Changes in PA and PS from before (1) to after (2) massage and stretching.

Data obtained after the run with the PAAS were analyzed with a repeated measures MANOVA with PAFF, NAFF, TRNQ, and FTIG being the dependent measures. This test yielded a statistically significant multivariate main effect, Wilks' Lambda = .692, $F(4, 26) = 2.89$, $p < .05$. Follow up univariate tests showed that TRNQ was higher after the run that was preceded by massage ($M = 5.3$, $SD = 1.9$) than after the run that was preceded by stretching ($M = 4.7$, $SD = 1.8$). The mean differences were statistically significant, $F(1, 29 = 6.1$ $p < .05$, $d = .32$. Perceived FTIG was lower in the after-massage run ($M = 5.00$, $SD = 3.2$) than in the after-stretching run ($M = 5.8$, $SD =$

3.4). However, statistical significance was not reached, $F(1, 29) = 3.6$, $p < .07$, $d = .24$. No differences in PAFF and NAFF were seen after the two running sessions. The RPE 15-min into the post-massage run was statistically significantly lower ($M = 13.6$, $SD = 1.8$) than in the post-stretching run ($M = 14.6$, $SD = 1.5$, $F(1, 29) = 16.9$, $p < .05$, $d = .60$. Finally, mean exercise heart rates in the two running sessions did not differ statistically significantly after massage ($M = 166.6$, $SD = 15.6$) and after stretching ($M = 170.2$, $SD = 15.4$).

Discussion

Supporting the research hypothesis of the study, that massage would have facilitating effect on exercise performance, the data have confirmed that running after massage resulted in lower perceived exertion than running after stretching. This finding was unrelated to the workload selected by the participants, because there were no statistically significant differences in the average exercise heart rates during the two runs. Indeed, in both sessions participants ran at about 84% of their maximal heart rates. The lower RPE reported after massage-preceded run could have resulted from muscular facilitation or psychological relaxation, hence arousal regulation, or possibly a combination of the two. It may be worthy to recall from Figure 1 that participants started their run with higher positive affect after massage in contrast to stretching that could have influenced later their perceived RPE. The lower perceived RPE after massage may have also translated into lower perceived FTIG, albeit this finding was only a trend rather than a statistically significant effect.

The results also illustrate that a 10-min pre-event massage increases positive affect and decreases perceived physical symptoms. The decrease in physical symptoms may be attributed directly to the therapeutic effects of massage on blood flow, connective tissues, muscle, and the nervous system (Goats, 1994). The results also corroborate past research findings showing that massage triggers both physical (Goats, 1994) and psychological (Diego, Field, Sanders, & Hernandez-Reif, 2004; Hasson et al., 2004) benefits. In this inquiry, stretching also decreased perceived physical symptoms, but in contrast to Parente's (2000) results, it did not improve affect. The NA did not change in either condition. This finding may be attributed to relatively low NA scores in the sample studied (known as floor-effect). Alternately, it is possible that longer than a 10-min intervention is needed to detect statistically significant decreases in NA in healthy participants.

The higher tranquility (TRNQ) after the running session preceded by the massage, in contrast to the run after stretching, could be interpreted as a psychological carry-over effect of the pre-event massage. Therefore, massage appears to have beneficial effects during and following exercise. The use of PAAS for gauging affect after running is justified by the fact that an exercise-specific instrument was the most appropriate to measure affect after the run. Furthermore, only post-exercise affect was studied, in contrast to changes from pre- and post-run, because participants' affect before the run was already modified by massage. The observed higher TRNQ scores and lower RPE (and a trend in lower FTIG) scores after massage-preceded run in contrast to stretching-preceded run suggest that a brief period of pre-event massage has substantial psychological benefits both during and following running.

Conclusion

It is concluded that a 10-min pre-event massage triggers positive affect during and after running at self-selected workload. The effects of massage are mainly psychological because workload, that was an index of performance, was not higher after massage than after stretching. It is recommended that more controlled studies should be performed in this area to examine the psychological benefits of massage in competitive situations as well. Massage may be used concomitantly with other psychological skills like self-talk, imagery, or mental rehearsal while itself being an effective means of relaxation and arousal regulation.

References

American Psychological Association (2002). *Ethical principles of psychologists and code of conduct.* Retrieved May 10, 2008 from: http://www.apa.org/ethics/code2002.html

Benjamin, P. L., & Lamp, S. P. (1996). *Understanding Sports Massage.* Champaign, IL: Human Kinetics.

Borg, G. (1985). *An introduction to Borg's RPE-scale.* New York: Movement Publications.

Diego, M. A., Field, T., Sanders, C., & Hernandez-Reif, M. (2004). Massage therapy of moderate and light pressure and vibrator effects on EEG and heart rate. *International Journal of Neuroscience, 114*, 31-44.

Gauvin, L., & Rejeski, W. J. (1993). The exercise-induced feeling inventory: development and initial validation. *Journal of Sport & Exercise Psychology, 15*, 403-423.

Gauvin, L., & Szabo, A. (1992). Application of the experience sampling method to the study of the effects of exercise withdrawal on well-being. *Journal of Sport & Exercise Psychology, 14,* 361-374.

Goats, G. C. (1994). Massage: The scientific basis of an ancient art: Part 2. Physiological and therapeutic effects. *British Journal of Sports Medicine, 28,* 153-156.

Hasson, D., Arnetz, B., Jelveus, L., & Edelstam, B. (2004). A randomised clinical trial of the treatment effects of massage compared to relaxation tape recordings on diffuse long-term pain. *Psychotherapy Psychosomatic, 73*, 17-24.

Hilbert, J, E., Sforzo, G, A., & Swensen, T. (2003). The effects of massage on delayed onset muscle soreness. *British Journal of Sports Medicine, 37*, 72-75.

Lox, C. L., McAuley, E., & Tucker, R.S. (1995). Exercise as an intervention for enhancing subjective well-being in an HIV-1 population. *Journal of Sport & Exercise Psychology, 17,* 345-362.

Lox, C. L., Jackson, S., Wasley, D., & Treasure, D. (2000). Revisiting the measurement of exercise induced feeling states: The Physical Activity Affect Scale (PAAS). *Measurement in Physical Education and Exercise Science, 4*, 79-95.

McAuley, E., & Courneya, K.S. (1994). The subjective exercise experience scale (SEES): development and preliminary validation. *Journal of Sport & Exercise Psychology, 16,* 163-177.

Micklewright, D., Griffin, M., Gladwell, V., & Beneke, R. (2005). Mood state response to massage and subsequent exercise. *The Sport Psychologist, 19,* 234-251.

Parente, D. (2000). Influence of aerobic and stretching exercise on anxiety and sensation-seeking mood state. *Perceptual and Motor Skills, 90*, 347-348.

Weerapong, P., Hume, P. A., & Kolt, G. S. (2005): The mechanisms of massage and effects on performance, muscle recovery and injury prevention. *Sports Medicine 35*, 235-256.

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