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Dynamics of the Affective States During and After Cheerleading Training in Female Athletes

Abstract: *Cheerleading is a new sport, practiced in 110 nations; since 2016 enjoys provisional Olympic status. Its leaders claim that it is a "happy" sport, but research on its psychological effects is lacking. In this field-study we examined core-affect, positive-affect, and negative-affect in 65 cheerleaders before, during, after, and one-hour after a cheerleading training. Core-affect was more positive during and immediately after training, but it tapered off one hour following the training when feeling states were still more positive than at baseline. Negative-affect declined linearly from baseline to one-hour following training when it became significantly lower than its previous values. Positive-affect showed quadratic dynamics, in parallel with arousal, being higher during and immediately after training than during baseline, or one-hour after training. These results demonstrate for the first time that cheerleading is a "happy" sport, which apart from the skill-development also yields positive psychological emotions both during and after training.*

Keywords: *Activation, Affect, Exercise, Emotion, Feeling state*

It is agreed that a single bout of exercise improves affect (Anderson & Brice, 2011; Dasilva et al., 2011), which is the mental state that reflects how an activity, or a situation, impacts the person (Duncan & Barrett, 2007). The benefits of a single workout on affect were previously demonstrated in different forms of exercise, including: dance aerobics (Rokka, Mavridis, & Kouli, 2010), Nordic walking (Stark, Schöny, & Kopp, 2011), running (Hoffman & Hoffman, 2008; Szabo, 2003), shadowboxing (Li & Yin, 2008), swimming (Valentine & Evans, 2001), taekwondo (Toskovic, 2001), tai chi (Wang et al., 2010), walking (Dasilva et al., 2011), yoga (Streeter et al., 2010), Bikram yoga (Szabo, Nikházy, Tihanyi, & Boros, 2017), Pilates (Tolnai, Szabó, Köteles, & Szabo, 2016), and spinning (Szabo, Gáspár, Kiss, & Radványi, 2015).

Cheerleading is a relatively new but continuously evolving sport; its main governing body is the International Cheer Union with 110-member nations (International Cheer Union, 2017). Current research on cheerleading primarily focuses on sport-related injuries (Boden, Tacchetti, & Mueller, 2003; Currie, Fields, Patterson, & Comstock, 2016; Hutchinson, 1997; Jacobson, 2005; Jacobson et al., 2004; Mueller, 2009; Shields & Smith, 2006; 2009). Other research focuses include gender issues (Anderson, 2008; Clifton & Gill, 1994; Grindstaff & West, 2006; 2010; Suitor & Reavis, 1995), stereotypes (Bennett, 1990; Meaney, Dornier, & Owens, 2002; Moritz, 2011), eroticism and sex (Bennett, 1990; Bettis & Adams, 2006; Jane, 2017) and physiological aspects associated with the sport (Maslyak et al., 2018; Maslyak & Krivoruchko, 2015; 2016; Rowe, Wright, Nyland, Caborn, & Kling, 1999). Few studies have looked at the psychological characteristics of cheerleading. Those that studied psychological factors primarily focused on confidence (Clifton & Gill, 1994; Finkenberg, Dinucci, McCune, & McCune, 1992), motivation (Kao & Watson, 2014; Raabe & Readdy, 2016), or body image (Monsma, Gay, & Torres-McGehee, 2016). Research on the acute psychological benefits of the sport is lacking.

Cheerleading is based on dance acrobatics and music. Therefore, by its nature cheerleading is claimed

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to be a "happy sport" (Kellogg, 2015) that should yield positive changes in affect during and/or after training. Despite the posited natural link between the sport's profile and anticipated psychological benefits, no studies have examined the affective changes associated with cheerleading training. However, the mere lack of past work does not fully justify the new research effort, but the presumed *happy* nature of this relatively new sport warrants scholastic verification considering a relevant theory. The "affect theory of happiness" suggests that people infer happiness from situations or life events that generate positive affect (Schwarz & Strack, 1991). Apart from physical exercise, the specific components of cheerleading, such as dance and music (Campion & Levita, 2013), could boost affect during and after training. Hence, the dynamics in affect linked to this sport could have both theoretical and practical implications.

Ekkekakis and Petruzzello (2002) presented a dimensional approach, known as the circumplex model (Posner, Russell, & Peterson, 2005), which is useful in examining affect during and after exercise. To gauge overall affect, one can conceptualize *core affect* (Russell, 2003) as a two-dimensional construct characterized by both affective *valence* (ranging from feeling states of pleasure to displeasure) and subjectively perceived *activation* (i.e., state of arousal; Russell, 2003). Hence, the dynamic states of affect could be conceptualized as a combination of these two dimensions yielding four quadrants (a) high-arousal, pleasant affect (e.g., excited), (b) high-arousal, unpleasant affect (e.g., anxious), (c) low-arousal, unpleasant affect (e.g., lazy) and (d) low-arousal, pleasant affect (e.g., tranquil; Ekkekakis & Petruzzello, 2002). Previous research has revealed increased pleasant-activated affect after various aerobic forms of exercise (e.g. Hall, Ekkekakis, & Petruzzello, 2002; Van Landuyt, Ekkekakis, Hall, & Petruzzello, 2000). In fact, changes in activation (arousal) and valence (affect) are hard to distinguish because affective responses are organized in a circumplex fashion and, therefore, changes in affect include a certain degree of shift in arousal and vice versa (Barrett & Bliss-Moreau, 2009). Similar psychological dynamics in affect are expected in cheerleading, as based on its movement and environmental components clearly affecting one's state of arousal.

While core affect reflects a distinct and conscious momentary feeling state, changes in positive- and negative affect could provide additional information and a more complex picture about the acute effects of exercise. Although these constructs were presumed to be relatively independent of each other (Mackinnon et al., 1999), a recent comprehensive meta-analysis of the neuroimaging literature concluded that there is a flexible affective neural workspace that, based on neuroimaging evidence, is involved in both positive and negative affect (Lindquist, Satpute, Wager, Weber, & Barrett, 2015). These results, at the level of regional brain activity, might imply that there is no single brain region, or even neural pathway, that distinguishably represents positive- or negative affect. This conclusion matches the bulk of the current views on the relationship between positive- and negative affect and thus opposite changes (bipolar) stemming from an intervention, such as exercise, may not be necessarily observed (Crawford & Henry, 2004; Green & Salovey, 1999).

In the current study we examined affective states before (control, or baseline), during (in middle of the training), after (within 5 minutes) and one hour after cheerleading training. The hypothesis was that cheerleading induces positive changes in affect, which persist even after one hour following training. The study was conducted "*in-situ*", that is in the habitual training environment of the athletes.

Method

Participants

A priori sample size was determined with the G*Power (v. 3) software (Faul et al., 2007), which indicated that the minimum required sample size for the current research design (repeated measures multivariate analysis of variance) was 60 (as based on: $f = .25$, $\alpha = .05$, $r = .20$ (minimal assumed r between repeated measures) and 1- $\beta = .95$). With the help of a coach, athletes were recruited through personal solicitation for participation in the study. In total, 65 female cheerleading athletes (mean age = 21.92 ± SD = 2.99 years) have volunteered for the study. They all were members of a large university's sport association's cheerleading division. They performed the sport at a competitive level and were involved in cheerleading sport for an average of 28.34 months ($SD = 20.68$). All participants signed an informed consent before taking part in the study. Ethical permission for the research was obtained from the Research Ethics Committee of the Faculty of Education and Psychology at the Eötvös Loránd University in Budapest, Hungary. The research was conducted in total accord with the ethical regulations and guidelines of the World Medical Association's Declaration of Helsinki (World Medical Association, 2008).

Instruments

The circumplex model of affect was assessed by two-single item scales, the Feeling Scale (FS; Hardy & Rejeski, 1989) and the Felt Arousal Scale (FAS; Svebak & Murgatroyd, 1985). The former measures affective valence on an 11-point Likert Scale ranging from –5 (feeling *very bad*) to +5 (feeling *very good*), while the later measure activation on a 6-point Likert scale ranging from 1 (*low arousal*) to 6 (*high arousal*). Further, we also employed the Hungarian version (Gyollai, Simor, Köteles, & Demetrovics, 2011) of the psychometrically validated 10-item short version of the Positive Affect Negative Affect Schedule (PANAS; Thompson, 2007). Each item is rated on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*very much*). A total score is then obtained for both positive (5) and negative (5) items. The internal

reliability of the PANAS was reported to be (Cronbach's alpha) .78 for positive affect and .76 for negative affect (Thompson, 2007); for the Hungarian short version internal reliability values ranged between .73 to .79 for positive affect and between .65 to .67 for negative affect (Gyollai et al., 2011). In a more recent study these values were .82 and .83, respectively (Szabo & Kocsis, 2017).

Procedure

Volunteering participants completed the three questionnaires at four times: (a) within 5 minutes before the start of the two-hour long training session, (b) after the first hour of the training session, right at the midpoint, (c) within five minutes immediately after the training session, and (d) one hour after the training session. The time between the third and the fourth assessment was spent with preparing for going home and actual commuting home, given that the training session was normally scheduled for late evening. All participants carried a mobile phone with alarm function that was set for a reminder – at 60-minutes after training – to fill out the questionnaires for the last time within 5 minutes after the alarm sound. After completion, these questionnaires were immediately forwarded as a picture image to the researchers using a Smartphone communication channel (later the paper versions of the scales were also handed to the researchers). Apart from requesting this image transmission for time-control (to ensure that the questionnaires were completed at the solicited time, i.e., 60 minutes after the end of the training session), the participants were also requested to notify the researchers if any "non-ordinary" event(s) – that could have had a notable impact on affect – has taken place within the last 60 minutes after the training. No such event was reported by any of the participants.

Results

A repeated-measures multivariate analysis of variance (MANOVA) yielded a statistically significant multivariate time main effect (Pillai's Trace = .751, $F_{12, 53} = 13.31$, $p < .001$, effect size: partial Eta squared ($p\eta^2$) = .751). The univariate results revealed that all the four dependent measures (felt arousal, feeling sates, positive affect, and negative affect) have changed statistically significantly over the four assessment times ($p < .001$ all, $p\eta^2$ range: .119–.280). Feeling states showed both linear ($F_{1,64)} = 24.61$, $p < .001$, $p\eta^2 = .278$) and quadratic ($F_{1, 64} = 23.44$, $p < .001$, $p\eta^2 = .268$) dynamics over time; Felt arousal exhibited a quadratic pattern over time ($F_{1, 64} = 67.64$, $p < .001$, $p\eta^2 = .514$); Negative affect manifested a linear decrease over time ($F_{(1, 64)} = 26.01$, $p < .001$, $p\eta^2 = .289$); Positive affect, again, exhibited a quadratic pattern ($F_{(1, 64)} = 57.14$, $p < .001$, $p\eta^2 = .472$). These patterns of changes over time, in the four dependent measures, are illustrated in Figure 1. The means and standard deviations recorded at the four times of the assessment, along with the results of

Figure 1. Pattern of changes in the four dependent measures across four different times (1) pre-training, (2) middle of the training, (3) post-training, and (4) one-hour post-training, depicting the statistically significant linear and quadratic patterns

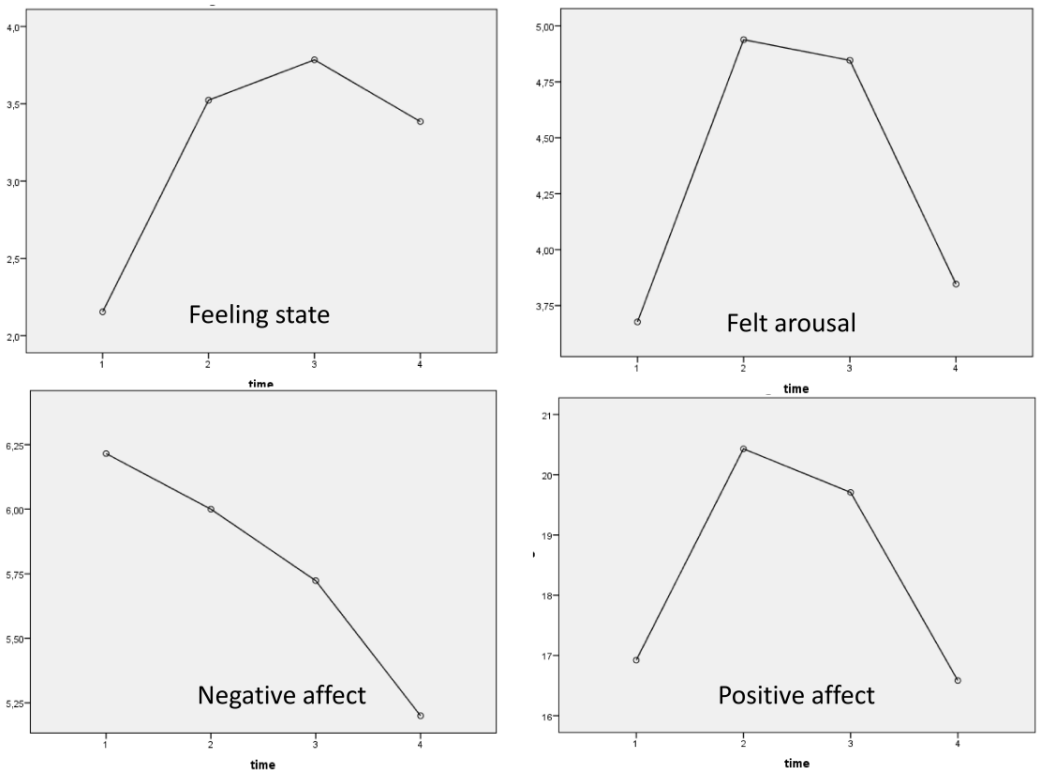


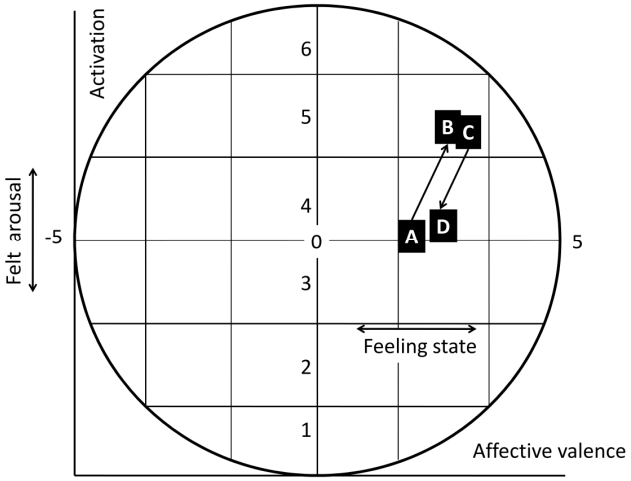
Table 1. Mean and standard deviations of the four dependent measures at four times of assessment also embedding the results of the Bonferroni-corrected post-hoc tests

	Pre-training (1)	60 min into training (2)	Post-training (3)	One hour after training (4)
Feeling state	2.15 (2.01) [2, 3, 4]	3.52 (1.71) [1]	3.78 (1.64) [1]	3.38 (1.53) [1]
Felt arousal	3.68 (1.17) [2, 3]	4.94 (0.93) [1, 4]	4.85 (1.23) [1, 4]	3.85 (1.44) [2, 3]
Negative affect	6.21 (1.69) [4]	6.00 (1.72) [4]	5.72 (1.46) [4]	5.20 (0.54) [1, 2, 3]
Positive affect	16.92 (4.05) [2, 3]	20.43 (3.88) [1, 4]	19.71 (4.20) [1, 4]	16.58 (4.59) [2, 3]

Note: Superscript numbers denote Bonferroni correction-based statistically significant differences from cells having the indicated column number (i.e., Feeling state pre-training differs from values at the other three times, while those three do not differ from each other).

the Bonferroni post-hoc tests, are illustrated in Table 1. The results illustrating the changes in core affect, by considering the circumplex model, are shown in Figure 2.

Figure 2. Pattern of changes in core affect – defined as the junction of perceived feeling state (affective valence/ horizontal axis) and felt arousal (activation/vertical axis) – at four times of assessment: (A) pre-training; (B) 60 minutes (middle) of training; (C) immediately after training; (D) 60 minutes after training. (For exact values at the four points refer to Table 1)



Discussion

The current findings reveal positive acute changes in affect associated with training in cheerleading. These findings are the first to profile affective states in context of cheerleading. In contrast to several exercises and affect investigations that measure affective changes at pre- (baseline) and post-exercise (e.g., Berger, Darby, Zhang, Owen, & Tobar, 2016; Szabo et al., 2015; Teixeira Guimaraes, 2015), the current work also assessed affect during and one hour after the training session to obtain a more complete picture about the dynamics in affect. The results are in accord with the bulk of the literature reporting favourable changes in affect as a result of various sports and exercises (Dasilva et al., 2011; Hoffman & Hoffman, 2008; Li & Yin, 2008; Rokka et al., 2010; Stark et al., 2011; Streeter et al., 2010; Szabo, 2003; Szabo et al., 2015; 2017; Tolnai et al., 2016; Toskovic, 2001; Valentine & Evans, 2001; Wang et al., 2010). Findings pertaining to affect in the middle of the two-hour training and one-hour post-training, however, may be solely relevant to cheerleading. Therefore, these results are difficult to discuss with reference to other forms of sport or exercise activities.

The reported pattern of feeling states (affective valence) was linear in that it increased from baseline and was consistently higher during and at two times after training. However, it was quadratic too, because it started to taper off from the peak experienced immediately after exercise, even though the two post-training measurements (immediately after and one hour after) of this variable were statistically not significantly different. The fact that feeling states were significantly higher even one hour after training in contrast to the baseline shows that the practice of cheerleading had positive impact on affect that lasted for at least 60 minutes. Thus, the prolonged positive experiences may provide an extended interval for inference about athlete's subjective feelings and contribute to the overall appraisal of happiness considering the affective theory of happiness (Schwarz & Strack, 1991).

Subjectively experienced felt arousal unfolded as expected and displayed a quadratic pattern in that training increased arousal, which was still noticeable immediately after, or within five minutes after exercise, but it has returned to baseline one hour after the training. Indeed, while the baseline and one-hour post-training measures did not differ significantly from each other, they were significantly lower than the felt arousal reported during as well as immediately after exercise, which did not differ significantly from one another. Accordingly, core affect was the highest immediately after exercise and due to decreased activation shifted back towards the baseline one hour after exercise (refer to Figure 2) while affective valence was still higher than that recorded at baseline. Therefore, a reversal in core affect one hour after cheerleading training was due to physiological decrease in arousal, whilst subjectively experienced feeling states were still significantly higher than at baseline (refer to Table 1).

This quadratic pattern in core affect, driven by the change in arousal, is complemented by results observed in

negative- and positive affect. The former showed a continuous decrease from baseline to the last measurement one hour after training and reached significance only at this point in contrast to the first three measurements. In other words, significant amelioration in negative affect, emerged only one hour after training, which is in contrast with core affect that peaked immediately after exercise. It should be noted that negative affect was virtually absent one hour after training, considering that its lowest rating value is 5 (refer to Table 1).

Finally, positive affect showed a quadratic pattern akin to arousal (refer to Figure 1) and while in contrast to the baseline it was higher during and immediately after training, one hour after training returned to baseline level. At the same time, reported feeling states were still significantly above the baseline. This observation can be ascribed to the lowest negative affect reported one hour after training, suggesting that affective valence is mentally appraised in terms of a balance between positive and negative affect. Such findings are consistent with the flexible affective neural workspace (Lindquist et al., 2015) presumed to regulate affect.

Our findings are consistent with relevant reports from the literature in that exercise training is associated with increased levels of high-arousal positive affect (Hogan, Mata, & Carstensen, 2013). In contrast to a recent exercise study in which the self-reported arousal increased during exercise and tapered off immediately after exercise (Bird, Hall, Arnold, Karageorghis, & Hussein, 2016), in our work the decrease in arousal was noticeable only one hour after exercise. The discrepancy in the results may be related to the duration of exercise (20 vs. 120 minutes) and the form of exercise (stationary cycling vs. cheerleading). As noted earlier it is difficult to discuss the current findings by considering similar works, because the unique nature of the cheerleading sport in which the apart from movement, the group-social interaction and music could also influence the affective measures. Indeed, Bird et al. (2016) have shown that music affects core affect during exercise above the movements' effects.

Taken together, these findings show that cheerleading is indeed a happy sport, if such a conclusion can be drawn upon improved core affect, decreased (to virtually none) negative affect after training and increased positive affect during and immediately after training. These findings also lend support to the independence of negative- and positive affect considering the parallel decrease in both during the hour following training. The present findings are limited to female athletes (but cheerleading is primarily performed by women, although men are also involved to a lesser extent) and further research with males is warranted. Our results also demonstrate the need for measuring affect not only pre- and post-training, but also during and at several times after training. We have re-assessed the subjectively experienced affective states one-hour after the training, but further assessments, at two and three hours, after training are also recommended for future studies examining the dynamics in affective states in the context of various forms of sports and exercise.

References

Anderson, E. (2008). "I used to think women were weak": Orthodox masculinity, gender segregation, and sport. *Sociological Forum, 23*(2), 257–280). doi: 10.1111/j.1573-7861.2008.00058.x

Anderson, R. J., & Brice, S. (2011). The mood-enhancing benefits of exercise: Memory biases augment the effect. *Psychology of Sport and Exercise, 12*(2), 79–82. doi:10.1016/j.psychsport.2010.08.003

Barrett, L. F., & Bliss-Moreau, E. (2009). Chapter 4: Affect as a Psychological Primitive. *Advances in Experimental Social Psychology*, 167–218. doi:10.1016/s0065-2601(08)00404-8

Bennett, J. C. (1990). The secondary school cheerleader and ritualized sexual exploitation. *The Clearing House*, *64*(1), 4–7.

Berger, B. G., Darby, L. A., Zhang, Y., Owen, D. R., & Tobar, D. A. (2016). Mood alteration after 15 minutes of preferred intensity exercise: examining heart rate, perceived exertion, and enjoyment. *Journal of Sport Behavior*, *39*(1), 3–21.

Bettis, P. J., & Adams, N. G. (2006). Short skirts and breast juts: Cheerleading, eroticism and schools. *Sex Education*, *6*(2), 121–133. doi: 10.1080/14681810600578800)

Bird, J. M., Hall, J., Arnold, R., Karageorghis, C. I., & Hussein, A. (2016). Effects of music and music-video on core affect during exercise at the lactate threshold. *Psychology of Music*, *44*(6), 1471–1487. doi:10.1177/0305735616637909

Boden, B. P., Tacchetti, R., & Mueller, F. O. (2003). Catastrophic cheerleading injuries. *The American Journal of Sports Medicine*, *31*(6), 881–888. doi:10.1177/03635465030310062501

Campion, M., & Levita, L. (2013). Enhancing positive affect and divergent thinking abilities: Play some music and dance. *The Journal of Positive Psychology*, *9*(2), 137–145. doi:10.1080/17439760.2013.848376

Clifton, R. T., & Gill, D. L. (1994). Gender differences in self-confidence on a feminine-typed task. *Journal of Sport and Exercise Psychology*, *16*(2), 150–162. doi:10.1123/jsep.16.2.150

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *43*(3), 245–265. doi:10.1348/0144665031752934

Currie, D. W., Fields, S. K., Patterson, M. J., & Comstock, R. D. (2016). Cheerleading injuries in United States high schools. *Pediatrics*, *137*(1), e20152447. doi: 10.1542/peds.2015-2447

Dasilva, S. G., Guidetti, L., Buzzachera, C. F., Elsangedy, H. M., Krinski, K., De Campos, W., ... Baldari, C. (2011). Psychophysiological response to self-paced treadmill and overground exercise. *Medicine & Science Sports & Exercise*, *43*(6), 1114–1124. doi:10.1249/MSS.0b013e318205874c

Duncan, S., & Barrett, L. F. (2007). Affect is a form of cognition: A neurobiological analysis. *Cognition & Emotion*, *21*(6), 1184–1211. doi:10.1080/02699930701437931

Ekkekakis, P., & Petruzzello, S. J. (2002). Analysis of the affect measurement conundrum in exercise psychology: IV. A conceptual case for the affect circumplex. *Psychology of Sport and Exercise*, *3*(1), 35–63. doi:10.1016/s1469-0292(01)00028-0

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Finkenberg, M. E., Dinucci, J. N., McCune, E. D., & McCune, S. L. (1992). Cognitive and somatic state anxiety and self-confidence in cheerleading competition. *Perceptual and Motor Skills*, *75*(3), 835–839. doi: 10.2466/pms.75.7.835–839

Green, D. P., & Salovey, P. (1999). In What Sense are Positive and Negative Affect Independent? A Reply to Tellegen, Watson, and Clark. *Psychological Science*, *10*(4), 304–306. doi:10.1111/1467-9280.00158

Grindstaff, L., & West, E. (2006). Cheerleading and the gendered politics of sport. *Social Problems*, *53*(4), 500–518. doi: 10.1525/sp.2006.53.4.500

Grindstaff, L., & West, E. (2010). "Hands on Hips, Smiles on Lips!" Gender, race, and the performance of spirit in cheerleading. *Text and Performance Quarterly*, *30*(2), 143–162. doi:10.1080/10462931003628910

Gyollai, Á., Simor, P., Köteles, F., & Demetrovics, Z. (2011). Psychometric properties of the Hungarian version of the original and the short form of the Positive and Negative Affect Schedule (PANAS). *Neuropsychopharmacologia Hungarica*, *13*(2), 73–79.

Hall, E. E., Ekkekakis, P., & Petruzzello, S. J. (2002). The affective beneficence of vigorous exercise revisited. *British Journal of Health Psychology*, *7*(1), 47–66. doi:10.1348/135910702169358

Hardy, C. J., & Rejeski, W. J. (1989). Not What, but How One Feels: The Measurement of Affect during Exercise. *Journal of Sport and Exercise Psychology*, *11*(3), 304–317. doi:10.1123/jsep.11.3.304

Hoffman, M. D., & Hoffman, D. R. (2008). Exercisers achieve greater acute exercise-induced mood enhancement than nonexercisers. *Archives of Physical Medicine & Rehabilitation*, *89*(2), 358–363. doi:10.1016/j.apmr.2007.09.026

Hogan, C. L., Mata, J., & Carstensen, L. L. (2013). Exercise holds immediate benefits for affect and cognition in younger and older adults. *Psychology and Aging*, *28*(2), 587–594. doi:10.1037/a0032634

Hutchinson, M. R. (1997). Cheerleading injuries: Patterns, prevention, case reports. *The Physician and Sportsmedicine*, *25*(9), 83–96. doi:10.3810/psm.1997.09.1508

International Cheer Union (2017). *The Recognized World Governing Body of Cheerleading.* Home Page. Retrieved from: http://cheerunion.org/home/

Jacobson, B. H. (2005). An assessment of injuries in college cheerleading: distribution, frequency, and associated factors. *British Journal of Sports Medicine*, *39*(4), 237–240. doi:10.1136/bjsm.2004.014605

Jacobson, B. H., Hubbard, M., Redus, B., Price, S., Palmer, T., Purdie, R., & Altena, T. (2004). An assessment of high school cheerleading: injury distribution, frequency, and associated factors. *Journal of Orthopaedic & Sports Physical Therapy*, *34*(5), 261–265. doi:10.2519/jospt.2004.34.5.261

Jane, E. A. (2017). Is Debbie Does Dallas dangerous? Representations of cheerleading in pornography and some possible effects. *Feminist Media Studies*, *17*(2), 264–280. doi: 10.1080/14680777.2016.1187641

Kao, S.-F., & Watson, J. C. (2014). The multilevel effects of motivational climate on the collective efficacy in a cheerleading team. *International Journal of Sports Science & Coaching*, *9*(4), 593–603. doi:10.1260/1747-9541.9.4.593

Kellogg, K. (2015). *Youth Cheerleading – The Happy Sport.* Florida Youth Football and Cheer League. Retrieved from: https://fyfcl.com/blog/youth-cheerleading-the-happy-sport/

Li, G., & Yin, J. C. (2008). The effects of shadowboxing on mood and beta-Ep in still condition of female college students. *Journal of Beijing Sport University*, *31*(3), 357.

Lindquist, K. A., Satpute, A. B., Wager, T. D., Weber, J., & Barrett, L. F. (2015). The Brain Basis of Positive and Negative Affect: Evidence from a Meta-Analysis of the Human Neuroimaging Literature. *Cerebral Cortex, 26*(5), 1910–1922. doi:10.1093/cercor/bhv001

Mackinnon, A., Jorm, A. F., Christensen, H., Korten, A. E., Jacomb, P. A., & Rodgers, B. (1999). A short form of the Positive and Negative Affect Schedule: evaluation of factorial validity and invariance across demographic variables in a community sample. *Personality and Individual Differences*, *27*(3), 405–416. doi:10.1016/s0191-8869(98)00251-7

Maslyak, I., Bala, T., Krivoruchko, N., Shesterova, L., Kuzmenko, I., Kulyk, N., … & Zhuk, V. (2018). Functional state of cardiovascular system of 10–16-year old teenagers under the influence of cheerleading classes. *Journal of Physical Education and Sport*, *18*, 452–458. doi: 10.7752/jpes.2018.s163

Maslyak, I. P., & Krivoruchko, N. V. (2015). Quickness and endurance fitness of pedagogic college girl students under influence of cheer-leading. *Physical Education of Students*, *19*(4), 24–30. doi:10.15561/20755279.2015.0404

Maslyak, I. P., & Krivoruchko, N. V. (2016). Physical development of students of teacher training college as a result of exercises of cheerleading. *Physical Education of Students*, *20*(1), 55–63. doi: 10.15561/20755279.2016.0108

Meaney, K. S., Dornier, L. A., & Owens, M. S. (2002). Sex-Role Stereotyping for Selected Sport and Physical Activities across Age Groups. *Perceptual and Motor Skills*, *94*(3), 743–749. doi:10.2466/pms.2002.94.3.743

Monsma, E. V., Gay, J. L., & Torres-McGehee, T. M. (2016). Body image, maturation, and psychological functioning in college cheerleaders: A matter of position?. *Translational Journal of the American College of Sports Medicine*, *1*(8), 71–81. doi:10.1249/TJX.0000000000000007

Moritz, A. (2011). Cheerleading: not just for the sidelines anymore. *Sport in Society*, *14*(5), 660–669. doi: 10.1080/17430437.2011.575109

Mueller, F. O. (2009). Cheerleading injuries and safety. *Journal of Athletic Training*, *44*(6), 565–566. doi:10.4085/1062-6050-44.6.565

Posner, J., Russell, J. A., & Peterson, B. S. (2005). The circumplex model of affect: An integrative approach to affective neuroscience, cognitive development, and psychopathology. *Development and Psychopathology*, *17*(03). doi:10.1017/s0954579405050340

Raabe, J., & Readdy, T. (2016). A qualitative investigation of need fulfillment and motivational profiles in collegiate cheerleading. *Research Quarterly for Exercise and Sport*, *87*(1), 78–88. doi:10.1080/02701367.2015.1124970

Rowe, A., Wright, S., Nyland, J., Caborn, D. N., & Kling, R. (1999). Effects of a 2-hour cheerleading practice on dynamic postural stability, knee laxity, and hamstring extensibility. *Journal of Orthopaedic & Sports Physical Therapy*, *29*(8), 455–462. doi: 10.2519/jospt.1999.29.8.455

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, *110*(1), 145–172. doi:10.1037/0033-295X.110.1.145

Rokka, S., Mavridis, G., & Kouli, O. (2010). The impact of exercise intensity on mood state of participants in dance aerobics programs. *Physical Culture & Tourism*, *17*(3), 241–245.

Schwarz, N., & Strack, F. (1991). Evaluating one's life: A judgement model of subjective well-being. In F. Strack, M. Argyle, and N. Schwarz (Eds). *Subjective well-being. An interdisciplinary perspective*. Oxford: Pergamon.

Shields, B. J., & Smith, G. A. (2006). Cheerleading-related injuries to children 5 to 18 years of age: United States, 1990–2002. *Pediatrics*, *117*(1), 122–129. doi:10.1542/peds.2005-1139

Shields, B. J., & Smith, G. A. (2009). Cheerleading-related injuries in the United States: A prospective surveillance study. *Journal of Athletic Training*, *44*(6), 567–577. doi:10.4085/1062-6050-44.6.567

Stark, R., Schöny, W., & Kopp, M. (2011). [Acute effects of a single bout of moderate exercise on psychological well-being in patients with affective disorder during hospital treatment]. *Neuropsychiatrie: Klinik, Diagnostik, Therapie und Rehabilitation: Organ der Gesellschaft Osterreichischer Nervenarzte und Psychiater*, *26*(4), 166–170. doi: 10.1007/s40211-012-0033-7

Streeter, C. C., Whitfield, T. H., Owen, L., Rein, T., Karri, S. K., Yakhkind, A., … Jensen, J. E. (2010). Effects of yoga versus walking on mood, anxiety, and brain GABA levels: A randomized controlled MRS study. *Journal of Alternative and Complementary Medicine*, *16*(11), 1145–1152. doi:10.1089/acm.2010.0007

Suitor, J. J., & Reavis, R. (1995). Football, fast cars, and cheerleading: Adolescent gender norms, 1978–1989. *Adolescence*, *30*(118), 265–272.

Svebak, S., & Murgatroyd, S. (1985). Metamotivational dominance: A multimethod validation of reversal theory constructs. *Journal of Personality and Social Psychology*, *48*(1), 107–116. doi:10.1037/0022-3514.48.1.107

Szabo, A., Gáspár, Z., Kiss, N., & Radványi, A. (2015). Effect of spinning workouts on affect. *Journal of Mental Health*, *24*(3), 145–149. doi:10.3109/09638237.2015.1019053

Szabo, A., & Kocsis, Á. (2016). Psychological effects of deep-breathing: the impact of expectancy-priming. *Psychology, Health & Medicine*, *22*(5), 564–569. doi:10.1080/13548506.2016.1191656

Szabo, A. (2003). Acute Psychological benefits of exercise performed at self-selected workloads: implications for theory and practice. *Journal of Sports Science and Medicine*, *2*(3), 77–87.

Szabo, A., Nikházy, L., Tihanyi, B., & Boros, S. (2016). An in-situ investigation of the acute effects of Bikram yoga on positive- and negative affect, and state-anxiety in context of perceived stress. *Journal of Mental Health*, *26*(2), 156–160. doi:10.1080/09638237.2016.1222059

Teixeira Guimaraes, T., Macedo da Costa, B., Silva Cerqueira, L., de Carlo Andrade Serdeiro, A., Augusto Monteiro Saboia Pompeu, F., Sales de Moraes, H., … Camaz Deslandes, A. (2014). Acute Effect of Different Patterns of Exercise on Mood, Anxiety and Cortical Activity. *Archives of Neuroscience*, *2*(2). doi:10.5812/archneurosci.18781

Thompson, E. R. (2007). Development and Validation of an Internationally Reliable Short-Form of the Positive and Negative Affect

Schedule (PANAS). *Journal of Cross-Cultural Psychology*, *38*(2), 227–242. doi:10.1177/0022022106297301

Tolnai, N., Szabó, Z., Köteles, F., & Szabo, A. (2016). Physical and psychological benefits of once-a-week Pilates exercises in young sedentary women: A 10-week longitudinal study. *Physiology & Behavior*, *163*, 211–218. doi:10.1016/j.physbeh.2016.05.025

Toskovic, N. N. (2001). Alterations in selected measures of mood with a single bout of dynamic Taekwondo exercise in college-age students. *Perceptual and Motor Skills*, *92*(3c), 1031–1038. doi:10.2466/pms.2001.92.3c.1031

Valentine, E., & Evans, C. (2001). The effects of solo singing, choral singing and swimming on mood and physiological indices. *British Journal of Medical Psychology*, *74*(1), 115–120. doi:10.1348/000711201160849

Van Landuyt, L. M., Ekkekakis, P., Hall, E. E., & Petruzzello, S. J. (2000). Throwing the Mountains into the Lakes: On the Perils of Nomothetic Conceptions of the Exercise-Affect Relationship. *Journal of Sport and Exercise Psychology*, *22*(3), 208–234. doi:10.1123/jsep.22.3.208

Wang, C., Bannuru, R., Ramel, J., Kupelnick, B., Scott, T., & Schmid, C. H. (2010). Tai Chi on psychological well-being: Systematic review and meta-analysis. *BMC Complementary and Alternative Medicine*, *10*, 23. doi:10.1186/1472-6882-10-23 Retrieved from http://www.biomedcentral.com/1472-6882/10/23

World Medical Association (2008). *World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects*. Retrieved from http://www.wma.net/en/30publications/10policies/b3/17c.pdf.