Original Article

Attentional focus strategies used by regular exercisers and their relationship with perceived exertion, enjoyment, and satisfaction

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ABSTRACT

Individuals can focus their attention in different ways during exercise and different foci may influence psychological states experienced. The present study examined the distribution of attentional focus strategies in exercisers and their relationships with gender, perceived exertion, enjoyment, and satisfaction. Regular exercisers (176 females, 144 males) completed a measure of attentional focus and rated their perceived exertion, enjoyment, and satisfaction during an exercise session. All participants used more than one type of attentional focus during an exercise session. Males spent more time than females attending to task-relevant thoughts and external cues whereas females spent more time attending to task-irrelevant thoughts and external distractions. In females and males, time spent engaging in task-irrelevant thoughts was negatively correlated with perceived exertion and satisfaction with exercise. For females only, time using external distractions was negatively correlated with satisfaction and positively correlated with enjoyment. For males only, time attending to task-relevant external cues was positively correlated with perceived exertion and enjoyment. The observed gender differences in attentional focus preferences and the relationships with psychological states have implications for advice given to exercisers and approaches that aim to promote adherence to exercise programs. **Key words:** EXERCISE, ATTENTION, GENDER, EFFORT, EMOTION

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INTRODUCTION

A lack of physical exercise contributes to many health related diseases. Globally, 23% of adults and 81% of adolescents were not sufficiently active resulting in approximately 3.2 million deaths annually (WHO, 2014). A sedentary lifestyle doubles the risk of cardiovascular disease, obesity, and diabetes and increases the risk for high blood pressure and colon cancer amongst other illnesses (WHO, 2008). Furthermore, a lack of physical activity increases the likelihood of experiencing depression and anxiety (Deslandes et al., 2009). Current recommendations are that individuals should exercise at a moderate intensity for 30 minutes on most, if not all, days of the week and include regular vigorous exercise for extra health and fitness (Australian Institute of Health and Welfare, 2008; WHO, 2014).

However, despite the growing evidence of the benefits of physical activity on physical and mental health, many individuals are still deterred by regular exercise. Dishman et al. (1985) suggested that the determinants of exercise rely on three factors: personal characteristics (e.g., age), environmental characteristics (e.g., availability of time) and the nature of the activity (e.g., perceived exertion and exercise intensity). More recent research has increasingly recognised the role of psychological factors in exercise adherence. Satisfaction with one's exercise is subsequently positively related to exercise adherence, where the more satisfied an individual is with their exercise regime, the more likely they are to maintain long term exercise behaviour (Brassington et al., 2002). Similarly, exercise enjoyment is a crucial component to adherence and reaping the psychological benefits of exercise (Markland, 1999). The more the exercise is perceived to be strenuous and not enjoyable, the less likely the exercise behaviour will be maintained. Finally, it has been suggested that perceived exertion, which increases with a higher exercise intensity, can impact exercise adherence. This is because non-athletes are less likely to tolerate high intensity exercise programs which coincidentally reap greater cardiovascular benefits than moderate exercise (Glass and Chvala, 2001). Adherence to exercise programs has been shown to be positively correlated with enjoyment and negatively correlated with perceived exertion (Buckworth and Dishman, 2007).

Due to the relationship between engaging in regular exercise and psychological states during exercise, programs that promote exercise should be designed so that they maximize states such as satisfaction with and enjoyment of exercise, and reduce perceptions of exertion. The psychological strategies that individuals adopt may give a means by which to achieve these states. Research has shown that manipulating attentional focus during sport and exercise can divert attention away from uncomfortable physical sensations and even enhance performance (Lind et al., 2009; Neumann & Brown, 2013; Neumann & Heng, 2011). Psychological strategies, such as different forms of attentional focus, also have the potential to increase enjoyment and positive affect and, by consequence, the likelihood of adhering to an exercise regime (Buckworth and Dishman, 2007).

Running and other forms of non-scoring aerobic activities are a common form of physical exercise that can be influenced by an individual's attentional focus (Neumann & Piercy, 2013). In the context of elite distance running, Morgan and Pollock (1977) introduced the distinction between associative (task-relevant) and dissociative (task-irrelevant) attentional focus. Subsequently, attentional focus was conceptualised within a two dimensional framework by Stevinson and Biddle (1998) to include an internal and external direction in addition to a task-relevant and task-irrelevant attentional focus. An individual's attentional focus may thus be classified as one of four types: (a) task-relevant internal by attending to bodily sensations such as breathing or feelings of the legs; (b) task-relevant external by attending to stimuli or performance cues such as the distance run; (c) task-irrelevant internal by using mental distraction such as day-dreaming or rumination; and (d) task-irrelevant external by attending to stimuli such as music or the surrounding scenery. In a sample of

male and female non-elite runners, Stevinson and Biddle (1998) found that the athletes used a variety of attentional focus strategies during a race. Moreover, a task-relevant focus was used more than a task-irrelevant focus with task-irrelevant internal thoughts most closely associated with "hitting the wall".

The attentional framework of Stevinson and Biddle (1998) was extended by Wininger and Gieske (2010) in the process of developing the Measure of Attentional Focus. The significant advance in their approach was to further divide the task-relevant internal focus into different subtypes. It was argued that focusing on bodily sensations may not be the only way to adopt a task-relevant internal focus, but that it can involve focusing on strategy and goal setting (task-relevant thoughts) and encouraging self-talk and reminding oneself to 'relax' (self-talk). Wininger and Gieske (2010) developed their measure so that individuals allocated percentages of time in adopting the different types of attentional focus during a session. Wininger and Gieske (2010) reported results that supported the construct validity of the Measure of Attentional Focus in a sample of walkers and runners. During a race individuals would attend more to task-relevant aspects, particularly bodily sensations and external cues, whereas when training individuals attended more to task-irrelevant thoughts and external distractions. In addition, the percentage allocated to task-irrelevant aspects was negatively correlated with perceived exertion in individuals that were training.

In a review, Lind et al. (2009) concluded that the effects of task-relevant and task-irrelevant focus strategies may depend on various factors, such as the characteristics of the individual (e.g., gender, fitness level) or the task (e.g., type and intensity), and called for more research to clarify these relationships. Most of the research to date has been conducted on competitive and non-competitive athletes, such as the studies of Stevinson and Biddle (1998) and Wininger and Gieske (2010). However, further research is warranted in samples of regular exercisers given the importance of this group for understanding adherence to exercise programs. In addition, gender differences may play a role. It has been observed that females gauge progress through task-relevant factors and that there have been differences in the specific thought content within the attentional focus used by both genders (Lind et al., 2009). Duncan, Hall, Wilson, and Jenny (2010) suggested that females are internally driven to exercise for aesthetic purposes (e.g., being thin) and social acceptance amongst their peers. Borg (2007) found that when reporting physical symptoms, females were more attentive to their internal states than males. Conversely, males are more likely to be motivated to exercise for competition and external demand (e.g., keeping up with friends) (Duncan et al., 2010). Therefore, males may be more likely to focus on external factors such as distance and pace during running (Saris et al., 2003).

The present study examined attentional focus in a sample of regular exercisers to bridge the gap in the research which has focused mainly on athletes. The expanded model of attentional focus by Wininger and Gieske (2010) was applied as the conceptual framework. Male and female regular exercisers completed the Measure of Attentional Focus and questions regarding their perceived exertion, satisfaction, and enjoyment of exercise during a typical exercise session. The first aim was to describe the frequency of different attentional foci in the population of regular exercisers. The second aim was to test the relationship between the different attentional foci and perceived exertion, satisfaction, and enjoyment. Due to the recreational nature of the exercise, it was hypothesised that task-irrelevant foci would be most commonly used and that it would be associated with reduced perceived exertion, and higher satisfaction and enjoyment. However, gender differences were also expected. Females were expected to use more task-relevant internal foci than males, but that it would be associated with increased perceived exertion and decreased satisfaction and enjoyment. Males were expected to use more task-relevant external foci than females and that that it would be associated with decreased perceived exertion an increased satisfaction and enjoyment.

MATERIALS AND METHODS

Participants

Three hundred and fifty participants were recruited using two methods. Firstly, 45 participants were recruited through the first year psychology students who participated for partial course credit. Secondly, the study was advertised through the social network site, Facebook. The web link was made available publicly to all those who wished to participate and 275 participants were recruited through this method. In both approaches, the advertisements requested participation from those who engaged in regular exercise for general well-being only and not for competition or sport specific training. Participants were removed due reporting that they did not exercise at all (n = 7), did not exercise on a regular basis (n = 17), making nonsensical responses (n = 1), and providing incomplete data (n = 5). The final data set consisted of 320 participants (144 males and 176 females). The age ranged from 16 to 63 years (M = 26.62, SD = 8.08). Participants reported exercising between 1 time to 9 times a week (M = 3.70, SD = 1.63) and spending between 20 minutes to 4 hours exercising per session (M = 57.3, SD = 23.58). Most participants indicated the reason they exercised was for health and fitness (n = 124) or weight management (n = 110).

Measures

The questionnaire was comprised of five scales: the Stages of Change measure (SOC; Marcus et al., 1992), the Measure of Attentional Focus (MAF; Wininger and Gieske, 2010), Rate of Perceived Exertion Scale (RPE), Exercise Satisfaction Scale (ESS), and the Physical Activity Enjoyment Scale (PACES; Kendzierski and De Carlo, 1991). The latter four scales were required to be completed by participants with reference to a "typical exercise session".

The Stages of Change measure (SOC).

The SOC (Marcus et al., 1992) contains demographic questions such as age and gender. Participants were also required to choose one of the following statements which best suited them: *I currently do not exercise and do not intend to start exercising in the next six months, I currently do not exercise but I am thinking about starting to exercise in the next six months, I currently exercise some but not regularly, I currently exercise regularly,* or *I have been exercising regularly for the past six months or longer.* Participants were required to report the frequency with which they exercised (days a week and number of minutes per day). Participants also reported the number of sessions they would dedicate a week to performing strenuous activity (such as vigorous running), moderate activity (such as fast walking), or mild activity (such as easy walking). The SOC has adequate test-retest reliability (r = .78; Heltsley, 2008), is correlated with the Seven Day Physical Activity Recall Questionnaire (Blair, 1984; see Marcus and Simkin, 1993), and has adequate external validity (Sarkin et al., 2001).

Measure of Attentional Focus (MAF).

The MAF (Wininger and Gieske, 2010) determines which cognitive strategy participants used most during their exercise. The first question asked the participants to allocate a percentage of time to each category of *bodily sensations, task-relevant thoughts, self-talk, task-relevant cues, task-irrelevant thoughts,* and *external distraction*. The percentages could vary from 0 to 100 for any given category, but the allocation across categories was required to sum to 100. The next item required the participant to state their most preferred method of attentional focus. Participants selected one of the following four options: task-relevant internal cues, task-relevant external cues, task-irrelevant internal cues, and task-irrelevant external cues. Wininger and Gieske (2010) provide findings to support the validity of the MAF.

Rate of perceived exertion (RPE).

The Rate of Perceived Exertion scale (Borg, 1990) measures the perception of exertion using an ordinal scale of 6 to 20 (6 = *No exertion at all* to 20 = *Maximal exertion*), such that a higher score indicates higher intensity (Borg, 1990). The range of the scale is structured such that a rating of 6 corresponded to 60 beats per minute and 20, being the highest score, corresponded to 200 beats per minute (Atchley, 2011). Borg (2007) confirmed the validity of the RPE in measuring perceived intensity using physiological and self-report measures. Strong correlations were found between heart rate and RPE (r =.80 to .90; Atchley, 2011).

Exercise Satisfaction Scale (ESS).
Exercise satisfaction was measured on a Likert scale of 1 to 5 (1 = *dislike very much;* 5 = *like very much*). The item was worded as "Please rate your level of satisfaction with a typical exercise session by selecting the appropriate response below".

Physical Activity Enjoyment Scale (PACES).
Kendzierski and DeCarlo (1991) developed the PACES to measure enjoyment of exercise. The modified version of the PACES has 16 items with a 5-point scale (1 = *Disagree a lot*; 5 = *Agree a lot*). Participants were asked to rate how they felt about each statement in relation to a typical exercise session. Example items included *'I enjoyed it'* and *'It frustrated me'*. Felton et al. (2000) reported that the PACES correlated highly with SOC scale (Marcus et al., 1992) (r = .54) and self-efficacy (r = .37). The PACES shows high test-retest reliability (Kendzierski and DeCarlo, 1991). In the present study, Cronbach's alpha was .79.

Procedure
Participants completed the questionnaires on-line in the following order: SOC, RPE, MAF, ESS, and PACES. All participants were advised to answer every item in relation to a typical exercise session. Prior to completing the questionnaires, participants provided informed consent to a protocol approved by the Institutional Ethics Review Committee.

Analysis
Inspection of the distributions indicated that most variables were positively skewed. The data was subjected to a square root transformation to improve normality. Analyses conducted on the transformed and untransformed data yielded identical results. To assist with interpretation of the means, the untransformed data are reported. Initial analyses also showed that there were no differences between females and males in ratings of perceived exertion (females: M = 9.28, SD = 2.90; males: M = 9.72, SD = 2.71), $t(318) = 1.39$, p = .17, satisfaction (females: M = 3. 48, SD = 0.88; males: M = 3.87, SD = 0.88), $t(318) = 0.33$, p = .74, or enjoyment (females: M = 59.66, SD = 14.29; males: M = 59.42, SD = 12.80), $t(318) = 0.16$, p = .87.

To examine the distribution of attentional focus types across the sample, participants were first grouped into one of four mutually exclusive categories according to Stevinson and Biddle's (1998) two dimensional model. Classification was based on responses to the question on what attentional focus participant's most used during a typical exercise session. Differences in the frequencies for each attentional focus type and gender were examined with a chi-square contingency analysis with further examination of significant effects using the adjusted standardised residuals. A second set of analyses were conducted using the percentages allocated in each of the categories of Wininger and Gieske's (2010) expanded model of attentional focus. As the total percentage across the categories was constant (i.e., 100%), a Gender x Attentional Focus factorial ANOVA was not used. A one way repeated measures ANOVA was conducted to test for differences in time allocated for each of the six types of attentional focus when averaged across females and males. The Greenhouse-Giesser correction was used in the ANOVA due to violation of the sphericity assumption and post hoc analyses employed repeated measures t-tests. Gender differences in the time allocated to the

attentional focus categories were tested using independent groups *t*-tests. To assess the relationship between the six categories of attentional focus and perceived exertion, satisfaction, and enjoyment, bivariate correlations were conducted. A statistical significance level of .05 was set for all analyses.

RESULTS

Table 1 shows the distribution of preferences according to the two dimensional model of attentional focus (Stevinson and Biddle, 1998) for males and females. The frequencies for males and females combined were similar across the four types of attentional focus. However, males and females differed for some focus types. More females than males reported to focus on task-irrelevant internal thoughts and task-irrelevant external stimuli. More males than females focused on task-relevant external cues. The frequencies for each attentional focus type was dependent on gender, χ^2 (3) = 12.90, p = .005. More males and fewer females preferred focusing most on task-relevant external cues than expected by chance (z_{adj} = 3.1, p = .002) and more females and fewer males reported focusing most on task-irrelevant thoughts (z_{adj} = 2.3, p = .02). All other residuals did not reach significance (all z_{adj} < 2.0, p > .05).

Table 1

Distribution of preferences across the four broad attentional focus types as classified according to Stevinson and Biddle's (1998) two dimensional model of attentional focus for females and males

Attentional focus type	Gender		Total
	Female	Male	
Task-relevant internal	49	43	92
Task-relevant external	32	48	80
Task-irrelevant internal	47	23	70
Task-irrelevant external	48	30	78

Note. The table shows frequencies for the females (n = 176), males (n = 144), and the total sample.

Examination of the percentages allocated to each of the six attentional focus categories of Wininger and Gieske (2010) showed that the ranges were similar for the task-relevant bodily sensations (0 – 80%), task-relevant thoughts (0 – 70%), task-relevant self-talk (0 – 50%), task-relevant external cues (0 – 70%), task-irrelevant internal thoughts (0 – 60%), and task-irrelevant external distractions (0 – 75%). As the ranges indicate, all participants allocated percentages to more than one type of attentional focus, thus indicating that they switched attention during an exercise session. Participants reported using two (2 females, 7 males),

three (11 females, 11 males), four (46 females, 39 males), five (76 females, 57 males), or six (41 females, 30 males) types of attentional focus.

Table 2 shows the mean percentages for the six categories of attentional focus in the females and males. Overall, the highest percentage of participants (21.73%) reported focusing on task-relevant bodily sensations while the lowest percentage (13.42%) focused on task-relevant self-talk. The ANOVA indicated that there were statistically significant differences between the categories, $F(4.29, 1368.30) = 11.11$, $p < .001$, $\eta_p^2 = .38$. A significantly greater percentage was allocated to bodily sensations than to task-relevant thoughts, $t(319) = 4.31$, $p < .001$, $d = 0.24$, task-relevant self-talk, $t(319) = 7.23$, $p < .001$, $d = 0.40$, task-relevant external cues, $t(319) = 4.01$, $p < .001$, $d = 0.22$, task-irrelevant internal thoughts, $t(318) = 5.32$, $p < .001$, $d = 0.30$, and task-irrelevant external distractions, $t(319) = 2.62$, $p = .009$, $d = 0.15$. A higher percentage was also allocated for task-relevant thoughts than task-relevant self-talk, $t(319) = 3.33$, $p = .001$, $d = 0.18$.

Examination of the gender differences for the time allocated to each of the attentional focus types showed that for the task-relevant internal cues category, there was no significance difference between males and females for bodily sensations, $t(318) = 0.85$, $p < .40$, and self-talk, $t(318) = -.008$, $p < .40$. However, males reported spending more time attending to task-relevant thoughts than females, $t(318) = 4.04$, $p < .001$, $d = 0.46$. For task-relevant external cues, there were also no significant difference, $t(318) = .17$, $p = .86$. For the task-irrelevant categories, females allocated more time than males to task-irrelevant thoughts, $t(318) = 1.99$, $p = .05$, $d = 0.22$, and external distractions, $t(318) = 2.29$, $p = .02$, $d = 0.26$.

Table 2

Mean percentages allocated to the different types of attentional focus as classified according to Wininger and Gieske's (2010) model of attentional focus for females and males (standard deviations are in parentheses).

Attentional focus type	Gender		Total
	Female	Male	
Task-relevant internal			
Bodily sensations	21.03% (15.53)	22.59% (17.46)	21.73% (16.42)
Task-relevant thoughts	13.87% (11.92)	19.88% (14.64)	16.57% (13.52)
Self-talk	13.41% (10.15)	13.42% (11.76)	13.42% (10.89)
Task-relevant external	16.22% (13.92)	15.96% (14.46)	16.10% (14.14)
Task-irrelevant internal	15.75% (13.54)	12.76% (13.05)	14.40 (13.39)
Task-irrelevant external	19.71% (17.79)	15.39% (15.42)	17.77 (16.88)

Table 3 shows the correlations for females and males. For females, task-relevant thoughts correlated negatively with perceived exertion, r = -.16, p = .04, and task-relevant self-talk correlated negatively with satisfaction, r = -.16, p = .04.. Task-relevant external thoughts correlated positively with perceived exertion, r = .23, p = .002, and satisfaction, r = .20, p = .01. Task-irrelevant thoughts correlated negatively with perceived exertion, r = -.17, p = .03, and satisfaction, r = -.18, p = .02. For males, task-irrelevant thoughts were also negatively correlated with perceived exertion, r = -.17, p = .04, and satisfaction, r = -.17, p = .04. Task-relevant thoughts were positively correlated with satisfaction, r = .19, p = .02. Furthermore, external distractions were negatively correlated with satisfaction, r = -.19, p = .02, but positively correlated with enjoyment, r = .20, p = .02.

Table 3

Correlations between the different types of attentional focus and perceived exertion, satisfaction and enjoyment for females and males

	Bodily sensations	Task-relevant thoughts	Self-talk	Task-relevant external cues	Task-irrelevant thoughts	External distractions	Perceived exertion	Satisfaction	Enjoyment
Task-relevant internal cues									
Bodily sensations	1	.16*	.02	-.27**	-.32**	-.39**	-.03	-.13	.05
Task-relevant thoughts	-.06	1	.26**	-.32**	-.12	-.45**	-.16**	-.12	-.03
Self-talk	-.07	.08	1	-.20**	-.08	-.29**	-.13	-.16*	.01
Task-relevant external cues	-.46**	-.20*	.07	1	-.18*	-.04	.23**	.20**	.02
Task-irrelevant thoughts	-.45**	-.25**	-.10	.06	1	.03	-.17*	-.18*	-.11
External distractions	-.15	-.35**	-.36**	-.16	.24**	1	-.06	.02	-.11
Perceived exertion	.04	.01	.03	.08	-.17*	-011	1	.23**	-.04
Satisfaction	.01	.19*	.05	-.004	-.17*	-.19*	.22**	1	.37**
Enjoyment	.12	-.08	-.01	-.13	-.06	.20*	.12	.18*	1

Note: * $p < 0.5$, ** $p < .01$. Correlations for female exercisers ($n = 176$) are displayed above the diagonal line and for male exercisers ($n = 144$) are below the diagonal line.

DISCUSSION

The aim of the present study was to identify the frequency of attentional foci utilized by non-elite exercisers. The study also aimed to examine the relationship between the different types of attentional focus and perceived exertion, satisfaction, and enjoyment. The main findings were that exercisers used a variety of attentional focus strategies during a single exercise session. Although a focus on task-relevant internal bodily sensations was used most often, males and females differed in how often they used other types of strategies. Females focussed on task-irrelevant aspects more than did males, whereas males focussed more on task-relevant thoughts than did females. The ways an individual focussed their attention during an exercise session was shown to be a related to feeling and affective states. Correlational analyses showed several meaningful relationships between time spent using different attentional focus types, perceived exertion, satisfaction, and enjoyment.

Wininger and Gieske (2010) stated the importance of a more specific differentiation of attentional focus in developing their proposed model of six attentional focus types. However, they also highlighted the usefulness of using the model initially suggested by Stevinson and Biddle (1998) and even the dichotomous comparison between task-relevant (association) and task-irrelevant (dissociation) focus to see overall patterns in the cognitive strategies used by individuals. Using the two dimensional model it was found that most individuals focussed on task-relevant internal cues. Across the entire sample, this was evident both when the most preferred focus was examined (92 of 320 participants; see Table 1) or the percentages allocated to each type of focus was examined (51.72% of time; see sum of task-relevant internal categories in Table 2). Based on these findings, it may be concluded that regular exercisers tend to adopt a task-relevant internal focus of attention when exercising, although they will switch attention to other things from time to time.

The notion of using a variety of strategies has been referred to as attentional flexibility (Lind et al., 2009, Moran, 1998) and the present findings are consistent with prior research showing a tendency for individuals

to shift between strategies (Sachs, 1984; Saintsing et al., 1988; Schomer, 1986). Such flexibility is likely to be adaptive so that the exerciser can appropriately attend to relevant internal or external cues as required according to the changing demands of the task. The higher tendency for individuals to adopt a task-relevant internal focus suggests that this type of focus is useful when engaging in exercise. The monitoring of internal bodily and mental states associated with the exercise may help regulate the exercise intensity and allow for appropriate responses to the exercise demands when required.

To explore more specific differences in the task-relevant internal category, further analyses were conducted using Wininger and Gieske's (2010) proposed model. Across the entire sample, there was a significantly greater amount of time allocated to task-relevant bodily sensations than task-relevant thoughts and self-talk. These findings substantiate the usefulness of distinguishing between the different forms of task-relevant internal focus types. Furthermore, correlational analyses showed some important differences in the relationship with other variables for the task-relevant internal focus. Time spend focussing on bodily sensations were unrelated to perceived exertion, satisfaction, and enjoyment. In contrast, time spent focussing on task-relevant thoughts was negatively correlated with perceived exertion in females and positively correlated with satisfaction in males. In contrast, self-talk was negatively correlated with satisfaction in females. These correlations suggest that task-relevant thoughts have some potentially beneficial relationships with feeling states during exercise. Indeed, Olympic cyclists have been reported to think about and set task-relevant goals to help cope with physical exertion and pain when racing (Kress and Statler, 2007).

Gender differences were found in the time spent across the task-relevant internal focus types. Males reported spending more time focussing on task-relevant thoughts than did females. Task-relevant thoughts encompass the thinking of strategies and goals while performing the physical exercise. The observed gender differences in task-relevant thoughts may have a number of explanations. Masters and Ogles (1998) reported that marathon runners who were more competitive and invested in their sport had stronger preferences to use a task-relevant focus. This might suggest that the males in the present study were more competitive or invested in their exercise. However, the task-relevant focus in Masters and Ogles was mainly measured as the focussing on bodily sensations. Nevertheless, future research could examine the potential relationship between motivational variables and preferences to engage in task-relevant thoughts for males versus females.

Gender differences also emerged in the other attentional focus categories. For the task-irrelevant categories, females reported using irrelevant thoughts and external distractions more often than males. These findings are in line with research reviewed by Lind at al. (2009), where it was suggested that female runners were more likely to focus on 'personal problem solving' during marathon training. In general, a task-irrelevant focus has been argued to be potentially beneficial for recreational exercisers or when engaging in physical activity at a low or moderate intensity (Lind et al., 2009). Whether such differences in the intensity of the exercise can explain the present gender differences is not clear. In the present study, females and males did not differ in ratings of perceived exertion. However, Saris et al. (2003) showed that men engaged in more vigorous activities than females. In contrast, Borg (2007) found that females reported higher perceived exertion than males under the same workload.

The correlational analyses showed some relevant relationships. As already noted, task-relevant internal attentional foci was related to perceived exertion and satisfaction. In addition, in both males and females, greater time spent in task-irrelevant thoughts was associated with lower perceived exertion and lower satisfaction. For males only, time spent attending to external distractions was negatively correlated with

satisfaction and positively correlated with enjoyment. These findings suggest that using task-irrelevant strategies is associated with both benefits and drawbacks. While it may be associated with reduced perceptions of exertion and increased enjoyment, it is also associated with reduced satisfaction. This may be because satisfaction is derived from feeling states associated with engaging in the exercise. Regular exercisers may gain a sense of satisfaction and accomplishment by perceiving that their exercise workout has taxed their body physically and mentally. The observed positive correlation between perceived exertion and satisfaction is consistent with this interpretation. Although the cause-effect relationship cannot be determined from the correlational approach used in the present study, the findings may suggest that a task-irrelevant attentional focus will reduce satisfaction with an exercise session. If this is the case, exercisers might be advised to switch attention towards task-relevant thoughts and external cues to enhance satisfaction, particularly near the end of the exercise session when physical workload demands may be at their greatest.

In regards to attentional focus, several authors have noted that a focus on one strategy will often be at the expense of another (e.g., Lind et al., 2009; Masters and Ogles, 1998; Wininger and Gieske, 2010). For example, while running performance outcome may be enhanced by focusing on a task-relevant cues and thoughts, the runner does not benefit from the enhancement in feeling states that come by using a task-irrelevant strategy (La Caille et al., 2004). It has been suggested that further research should address the issue of finding a balance between physiological outcomes and psychological benefits, which may be achieved through the notion of attentional flexibility (Lind et al., 2009).

Lind et al. (2009) emphasised the importance of descriptive studies in research on attentional focus during sport and exercise. The present study examined participants' self-reported exercise behaviour. While these reports focus on participants' subjective experiences in relation to exercise and so therefore are unlikely to be based on an objective observation, self-report data still has its own merits given that the current study was aimed at investigating participants' exercise experiences. An individual's subjective experience is a factor that can significantly contribute to exercise adherence. However, where possible, objective measures allow for more methodological control and are recommended for future research in the area. Future research may benefit from including physiological measures such as heart rate and gas exchange. This may yield physiological evidence for the changes that attentional focus can have on the individual's physiology (e.g., Vance et al., 2004; cf. Ziv et al., 2012) and relate these to changes in perceived exertion, satisfaction, and enjoyment. The inclusion of these measures in future research would facilitate a deeper understanding of the relationship between the physiological and affective aspects of exercise.

CONCLUSSIONS

The current study addressed the question of attentional focus preferences in regular exercisers and how they relate to gender and feeling states. It targeted the general population rather than a class of elite athletes. Research on general exercisers is beneficial as it includes an array of activities that are accessible to the public while past studies tended to focus on a specific sport such as running. The present findings suggest that exercisers should be encouraged to adopt a variety of attentional focus types during exercise. However, it should be recognised that strategies may be associated with higher or lower levels of perceived exertion and psychological states such as satisfaction and enjoyment. As research expands on the topic of attentional focus in non-elite exercisers, fitness and health professionals will have access to the information that can help to tailor gender specific and goal specific (performance driven vs. beginner exerciser) programs to suit individual needs. Health professionals will also be better equipped to educate beginners on the effective ways

of executing and adhering to an exercise regime, while slowly promoting the health benefits of regular physical exercise.

REFERENCES

1. Atchley, A. R. (2011). An examination of the effects of mindfulness and task relevant attentional focus on running performance. *Masters Theses & Specialist Projects, Paper 1069.* Retrieved from http://digitalcommons.wku.edu/theses/1069 on 03/03/2012.
2. Blair, S. (1984). How to assess exercise habits and physical fitness: In Matarazzo, J., Weiss, S., Herd, J., & Miller, N. (Eds), *Behavioral health: A hand-book of health enhancement and disease prevention.* (pp. 424-447). New York, NY: Wiley.
3. Borg, E. (2007). *On perceived exertion and its measurement.* Unpublished Doctoral thesis, University of Stockholm, Faculty of social Sciences, Department of psychology retrieved from http://urn.kb.se/resolve?urn=urn:nbn:se:su:diva-6862 on 03/03/12.
4. Borg, G. (1990). Psychophysical scaling with applications in physical work and the perception of exertion. *Journal of Work Environment Health*, *16*, 55-58
5. Brassington, G. S., Atienza, A. A., Perczek, R. E., DiLorenzo, T. M., & King, A. C. (2002). Intervention-related cognitive versus social mediators of exercise adherence in the elderly. *Am J Prev Med*, 23, 80-86. doi: 10.1016/S0749-3797(02)00477-4.
6. Buckworth, J., & Dishman, R.K., (2007). Exercise adherence. In G. Tenenbaum & R.C. Ecklund (Eds.), *Handbook of sports psychology* (3rd ed.) (pp. 509-536). Hoboken, NJ: John C. Wiley & Sons, Inc. doi: 10.1002/9781118270011.ch23
7. Deslandes, A., Moraes, H., Ferreira, C.,Veiga, H., Silveira, H., Mouta, R., Fernando, A. M. S., Evandro, P., Coutinho, S. F. & Laks, J. (2009). Exercise and mental health: Many reasons to move. *Neuropsychobiology, 59*, 191–198, doi: 10.1159/000223730
8. Dishman, R. K. Sallis, J. F. & Orenstein, D. R. (1985). The determinants of physical activity and exercise. *Public Health Rep, 100* (2), 158-171.
9. Duncan, L. R., Hall, C. R., Wilson, P. M., & Jenny, O. (2010). Exercise motivation: a cross-sectional analysis examining its relationships with frequency, intensity, and duration of exercise. *The International Journal of Behavioural Nutrition and Physical Activity, 7.* doi: 10.1186/1479-5868-7-7
10. Felton, G.M., Ott, A., & Jeter, C. (2000). Physical activity stages of change in African American women: Implications for nurse practitioners. *Nurs Pract Forum, 11,* 116-123.
11. Glass, S. C. & Chvala, A. M. (2001). Preferred exertion across three common modes of exercise training. *J Strength Cond Res, 15*, 474-479.
12. Heltsley, E. L. (2008). The influence of preferred attentional focus strategies on exercise induced changes in affect. *Masters Theses & Specialist Projects, Paper 2* Retrieved from http://digitalcommons.wku.edu/theses/2 on 03 /03/12.
13. Kendzierski, D., & De Carlo, K. J. (1991). Physical Activity Enjoyment Scale: Two validation studies. *J Sport Exercise Psy*, *3*, 50-64.
14. Kress, J. L., & Statler, T. (2007). A naturalistic investigation of former Olympic cyclists' cognitive strategies for coping with exertion pain during performance. *Journal of Sport Behavior, 30,* 428-452.
15. Lind et al., (2009). Do 'Mind Over Muscle' strategies work? Examining the effects of attentional association and dissociation on exertional, affective and physiological responses to exercise. *Journal of Sports Medicine,39*, 743-764.
16. Marcus, B. H., Selby, V. C., Niaura, R. S., & Rossi, J. S. (1992). Self-efficacy and the stages of exercise behavior change. *Res Q Exercise Sport, 63,* 60-66.
17. Marcus, B., H. & Simkin, L. R. (1993). The stages of exercise behavior. *J Sports Med Phys Fit, 33,*

83–88.
18. Markland, D. A. (2009). The mediating role of behavioural regulations in the relationship between perceived body size discrepancies and physical activity among adult women. *Hellenic Journal of Psychology*, *6*, 169-182.
19. Moran, A. P. (1998). Cognitive style constructs in sport: explanatory and attentional processes in athletes. *Int J Educ Res, 29,* 277-286.
20. Morgan, W.P. & Pollock, M. L. (1977). Psychological Characterization of the Elite Distance Runner. *Ann NY Acad Sci*, *301*, 382-403.
21. Neumann, D. L., & Brown, J. (2013). The effect of attentional focus strategy on physiological and motor performance during a sit-up exercise. Journal of Psychophysiology, 27, 7-15.
22. Neumann, D. L., & Heng, S. (2011). The effects of associative and dissociative attentional focus strategies on muscle activity and heart rate during a weight training exercise. Journal of Psychophysiology, 25(1), 1-8.
23. Neumann, D. L., & Piercy, A. (2013). The effect of different associative attentional focus strategies on physiological and psychological states during running. Australian Psychologist, 48, 329-328.
24. Sachs, M. L. (1984). The mind of the runner: cognitive strategies used during running. In M. L. Sachs & G. W. Buffone (Eds.), *Running as therapy: an integrated approach* (pp. 288-303). Lincoln (NE): University of Nebraska Press.
25. Saintsing D. E., Richman, C. L., Bergey, D. B. (1988). Effects of three cognitive strategies on long-distance running. *Bulletin of the Psychonomic Society, 26*, 34-6
26. Saris, W. H., Blair, S. N., van Baak, M. A., Eaton, S. B., Davies, P. S., Di Pietro, L., Fogelholm, M., Rissanen, A., Schoeller, D., Swinburn, B., Tremblay, A., Westerterp, K. R., & Wyatt, H. (2003). How much physical activity is enough to prevent unhealthy weight gain? Outcome of the IASO 1st Stock Conference and consensus statement. *Obesity Reviews , 4*, 101-114.
27. Schomer, H. H. (1986). Mental strategies and the perception of effort of marathon runners. *Int J Sport Psychol, 17*, 41-59.
28. Stevinson, C. D., & Biddle, S. J. (1998). Cognitive orientations in marathon running and "hitting the wall". *Journal of Sports Medicine, 32,*229-235.
29. Wininger, S. R., & Gieske, D. (2010). Measure of Attentional Focus: Cognitive Interviews and a Field Study. *Athletic Insight, 2*, 125-146.
30. WHO (2014). Physical activity. *World health report*. Retrieved from http://www.who.int/mediacentre/factsheets/fs385/en/
31. Ziv, G., Meckel, Y., Lidor, R., & Rotstein, A. (2012). The effects of external and internal focus of attention on physiological responses during running. *Journal of Human Sport & Exercise, 7,* 608-616.

