Physical self-perceptions and body composition in fitness instructors, regular exercisers and non-exercisers

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This study investigated physical self-perceptions (PSPP and PIP) and the relationship between physical self-perceptions and body composition measures (BMI, WHR, percentage body fat) in fitness instructors (n = 36), regular exercisers (n = 29) and non-exercisers (n = 35). Gender differences were apparent in the physical self-perceptions, males scoring higher on the attractive body, sports competence and physical self-worth sub-scales of the PSPP. Fitness instructors rated their bodily attractiveness, physical condition and physical strength significantly higher and perceived them as more important than the regular and non-exercisers. Also, fitness instructors and regular exercisers had higher levels of physical self-worth and sports competence and perceived sports competence as more important than the non-exercisers. Relationships between physical self-perceptions and body composition were found. For females higher fat percentage or BMI values were negatively associated with most of the sub-domains of the PSPP. It was concluded that participation in regular exercise is associated with more positive physical self-perceptions that might contribute to a 'life-time' commitment to exercise participation. Secondly, more longitudinal research is required to investigate the relationship between physical self-perceptions and changes in body composition. Finally, it was suggested that exercise programs should promote competence and should be conducted in a relatively 'body neutral' environment. Such an approach would propagate a more intrinsically motivated orientation to exercise participation and might have a more pronounced effect on physical self-perceptions and global physical self-esteem.

Introduction

Our understanding of the self has greatly increased in the proceeding years, especially in the area of measurement and structure (Fox, 1998). An important reason for the continued focus on the self is the recognition that enhanced self-esteem is strongly associated with improved health and mental well-being (Fox, 2000). Self-perceptions are central to the degree of self-esteem that an individual feels and perceptions of the physical self form a large component of these self-perceptions (Harter, 1996; Page & Fox, 1997). Higher levels of physical self-perceptions, in this respect, have repeatedly been found to be associated with higher levels of global self-esteem (Fox, 2002). Physical self-perceptions are generally formed in the context of cultural determinants of what is perceived as being beautiful and desirable body shape. There are clear gender differences in these perceptions, and women appear to be more affected by such values than men. For example, 90% of North American females are estimated to be dissatisfied with their body shape (Problast & Lieberman, 1992). Recent evidence, however, suggest that males are becoming as dissatisfied with their bodies as females (Davis & Cowles, 1991; O'Dea, Abraham, & Heard, 1996) striving for a muscular, mesomorphic body shape. Hence, the mesomorphic male is seen as more physically capable and as possessing more desirable personality traits and skills.

As a socially acceptable and cross-culturally promoted past-time, physical activity and exercise has been used by approximately 75% of those trying to control or adjust their figure (Kottke *et al*., 2002; Serdula *et al*., 1999). Exercise, in this respect, has been found to successfully improve self-esteem, and its enhancement has been a common objective of physical education and exercise programs (Fox, 2002). The enhancement of physical self-perceptions through exercise participation, in this respect, not just enhances global self-esteem (Fox, 2002) but is also related to increased frequency and duration of exercise sessions (Dempsey, Kimiecik, & Horn, 1993) and increased intrinsic interest in physical activity and exercise (Goudas, Biddle, & Fox, 1994). The aim of the present study was to investigate the physical self-perceptions of three groups of gym users: fitness instructors, regular gym users and a group of previously non-exercisers who just joined a gym. These groups, as would be expected, provide a contrasting difference in physical appearance and exercise experience. Furthermore, the fitness instructors often act as a role model for other gym users. Pressures on this group to act as a role model for an active and healthy lifestyle has, however, been under researched (Hoglund & Normen, 2002). Recent evidence has suggested that this group might have an excessive fear of becoming fat, might develop obsessive and distorted self-perceptions (Olson *et al*., 1996; Philips & Drummond, 2001) and might be more prone to developing eating disorders (Hoglund & Normen, 2002). Secondly, poor perceptions of the actual physical self is common in humans, and our perceptions of the actual physical-self often differ from exact anthropometrical measures (Garner, 1997). Therefore, this study also investigated the relationship between physical self-perceptions and body composition. Pertinent to this question is which body composition measure is most directly related to physical self-perceptions? Studies have tended to use only one indictor of body composition (either body weight, body fat percentage, body mass index (BMI), waist-to-hip ratio (WHR)). BMI, in this respect, is considered to provide the most useful population-level indicator of obesity (WHO, 1998) whereas the dominant index of body fat distribution has been the waist-hip circumference ratio (Shimokata *et al*., 1989). Although, measurements of circumference and BMI have been shown to be more accurate than measurements of body fat percentage this has been ascertained in many studies. Rather than selecting one technique in favour of another in the present

study the opportunity was taken to compare the three most popular indirect methods of body composition assessment (BMI, WHR, body fat percentage) to physical self-perceptions.

This study, thus, assessed physical self-perceptions and actual body composition of fitness instructors, regular exercisers and non-exercisers who just joined a gym and had been sedentary at least 6 months before joining. In this study it was hypothesised that males would have a more positive body image than females (Fallon & Rozin, 1985; Garner, 1997) and that the physically active male and female fitness instructors and regular exercisers would evaluate their physical appearance as more satisfactory than the non-exercisers (Davis et al., 1994 & 1991; Loland, 1998). Moreover, it has been suggested that fitness instructors, due to nature of their job, might be particularly prone to a critical attitude to body size and appearance (Davis, 1992). Such a notion would result in fitness instructors attaching significantly more importance to bodily attractiveness than regular or non-exercisers. Furthermore, relationships would be expected between aspects of physical self-esteem and actual body composition. For example, a low percentage body fat would be positively correlated to body satisfaction, physical self-worth and/or global physical self-esteem. Finally, it was predicted that levels of sport competence would differ between groups. Hence, people exhibiting high physical activity and exercise levels are thought of as having mastered the task/activity at hand resulting in increased beliefs in personal capabilities and positive self-evaluation and thus in higher levels of sports competence (Sonstroem & Morgan, 1989).

Method

Participants

Participants were 36 fitness instructors (20 males; 16 females), 29 regular exercisers (17 males; 12 females) and 35 (15 males, 20 females) participants who recently joined a gym (non-exercisers). Fitness instructors were taken from local leisure clubs and worked for a minimum of at least 20 hours a week (consisting of taking classes or personal instruction). Their mean age was 22.03 years (SD = 2.11). The regular exercisers exercised at least twice a week in a gym environment and had been members of a gym for at least six months. Their mean age was 22.36 (SD = 1.79). The non-exercisers were recruited during induction sessions from two public gyms. A criteria for inclusion to this study was that the non-exercise participants had to be sedentary for at least six months before joining the gym. Their mean age was 24.60 (SD = 3.68). Age was kept between the limits of 16-30 in order to minimise any age effects. Before the start of the study participants were briefed on the purpose of the study and they signed an informed consent statement. The study was approved by the appropriate University ethical committee.

Procedures and instruments

Participants first completed a background information questionnaire. This questionnaire provided details on exercise history for all subjects and the frequency and intensity of exercise sessions for the fitness instructors and regular exercisers. Intensity of average exercise sessions was measured using the Borg's Rate of perceived exertion scale (Borg, 1982) (note, the non-exercisers did not complete this part of the questionnaire). Participants than completed the Physical Self-Perception Profile (PSPP) and the Perceived Importance Profile (PIP) (Fox & Corbin, 1989). Finally, body composition measures were always taken after completion of the questionnaires to avoid biasing the responses.

The PSPP was developed by Fox and Corbin (1989) in order to investigate physical self-perceptions from a multidimensional point of view. The PSPP is made up of five subscales. Each subscale consists of 6 items, which have a 4 choice structured alternative answer format. Scores range from 6 to 24 on each subscale. Four of the subscales are designed to assess perceptions within specific subdomains of the physical self: Sports Competence, Physical Condition, Bodily Attractiveness, and Physical Strength; and one subscale is designed to measure overall Physical Self Worth. Subscales of the PSPP have been found to have high test-retest reliability (r =0.81 to 0.88) and high internal consistency (α =0.81 to 0.92) (Fox, 1990).

The PIP is an 8-item questionnaire that accompanies the PSPP. It was developed in order to assess perceived importance attached by an individual to each of the four sub domains of the physical self. The PIP consists of four, 2-item subscales, and scores range from 2 to 8. It has been recommended by Fox (1990) that scores of 5 and above are viewed as 'important'. Test-retest reliability coefficients ranging from 0.68 to 0.83 (Fox, 1990). A global physical self-esteem score was also calculated using the scores from the PSPP and the PIP. Discrepancy scores for the subscales were calculated by dividing the total score for each subscale by 3, and subtracting the PIP score relevant to that subscale (note, only if the PIP score was higher than 4.5 was the variable taken in consideration for the calculation of global physical self-esteem). The sum of all the discrepancy scores, taking into account any negative signs, gave a score for global physical self-esteem.

Height was measured to the nearest 0.05 cm using a stadiometer (Seca, 220 free-standing stadiometer, Birmingham). Participants' weight (kg) was assessed using a calibrated digital electronic scale (Seca, α 770 digital low form scale, Birmingham). Based on height and weight subject's BMI was calculated (body weight (kg) divided by stature squared (cm)).

Waist and hip circumferences were measured using a dressmaker's tape. Waist circumference was taken at the horizontal level between the xiphisternum and the umbilicus that yielded the minimum measurement. Hip circumference was the horizontal level around the buttocks posteriorly that yielded the maximum measurement. If duplicate readings differed by more than 2 cm, a third was taken. The average of the duplicates or the closest two of the three measurements was subsequently used to calculate the waist-hip circumference ratio (WHR) (dividing the value for the waist by that of the hips).

Bioelectric impedance analysis (BIA), using a Body Stat 1500 analyser, was used to determine the percentage body fat of the participants. The bioelectric impedance analysis method of assessing body composition in adults is based on the notion of a high correlation between an adult's fat-free mass and the body's electrical resistance (Hoffer, Meador, & Simpson, 1969). The level of body fat is directly related to the flow of electricity. Impedance of the body is converted into body density, which in turn was converted into percentage body fat using the Siri equation. Prior to testing participants were asked to maintain a normal level of hydration by fasting for at least two hours before testing, and avoiding strenuous exercise and alcohol for at least 8 to 12 hours before testing.

Statistical analysis

A multi-analysis of variance (MANOVA) (gender by group) was carried out to identify any significant differences between the genders and/or the three groups with regard to their scores on the inventories (PSPP/PIP). Follow-up univariate analysis of variance was executed in the instance of a significant main or interaction effect. If a significant omnibus F was obtained, Newman-Keuls test for *a posteriori* comparisons were employed to detect differences between the groups. One-way analysis of variance was conducted for the males and females separately to investigate any differences in body composition between the three groups. T-tests were performed in order to assess any differences in the frequency and intensity of exercise by the fitness instructors and the regular exercise group. Pearson's Product Correlation's were performed in order to establish any links between the inventories and the body composition measures. Finally, discriminant function analysis was performed. This was done in order to find-out which variable could best predict group membership. The data were analysed using the SPSS computer software program (SPSS Inc., Chicago, Illinois).

Results

The MANOVA (gender by group) showed a highly significant main effect for gender (Wilk's $\lambda = 0.547$; $p < 0.001$) and groups (Wilk's $\lambda = 0.409$; $p < 0.001$) and a significant interaction (Wilk's $\lambda = 0.502$; $p < 0.001$). Follow-up univariate analysis of variance identified significant interactions for the sports competence, bodily attractiveness and physical strength subscales of the PSPP as well as for their perceived importance (PIP) (see table 1). Gender main effects were found for the sports competence subscale and its importance and for bodily attractiveness and physical self-worth. For the group main effect significant differences were found for all 5 subscales of the PSPP as well as its importance (PIP).

As expected males were found to be significantly more satisfied with their body in comparison to the females. No differences were found between the males of any of the three groups. However, all three male groups had significantly higher body attractiveness scores in comparison to the female regular exercisers and the female non-exercisers ($p < 0.01$) (see table 2). The female fitness instructors, on the other hand, had significantly higher scores than the other two female groups ($p < 0.05$). No difference was found between the female fitness instructors and any of the male groups. Fitness instructors viewed body attractiveness as more important than the regular exercisers and non-exercisers. The male and females instructors having significantly higher PIP scores in comparison to the male and female regular and non-exercisers. Moreover, the female fitness instructors scored significantly higher on PIP than the male fitness instructors ($p < 0.05$) (see table 2). These results partly support the a priori hypothesis that males would have a more positive body image in comparison to females.

No difference was found in sport competence between the groups. Although males had significantly higher sports competence scores than the females in this study, this difference was mainly due to the female non-exercisers. This group scored significantly lower in comparison to all other groups ($p < 0.05$). However, the female non-exercisers, as well as the female regular exercisers, perceived sports competence as less relevant than the female fitness instructors and the three male groups. That is, the female regular and non-exercisers scored significantly lower on the PIP of sports competence than all other groups ($p < 0.05$).

With regard to physical strength it was found that the male and female regular exercisers and the female non-exercisers had significantly lower assessments of their physical strength in comparison to the male and female fitness instructors and the male non-exercisers ($p < 0.05$). Moreover, the female non-exercisers perceived their physical strength as less important in comparison to all other groups except the male regular exercisers. The male regular exercisers perceived importance of physical strength was found to be significantly lower from the male and female fitness instructors and the female regular exercisers ($p < 0.05$).

Males were found to have significantly higher levels of physical self-worth in comparison to the females. Also, the non-exercisers were found to have significantly lower levels of physical self-worth than the regular exerciser's and the fitness instructors. Finally, the fitness instructors were found to have significantly higher perceptions of their physical condition than the regular and non-exercisers. Also, fitness instructors perceived physical condition as more important in comparison to the regular and non-exercisers.

For both the males and females the one-way analysis of variance for percentage body fat resulted in a significant difference ($F(2,49) = 25.465$; $p < 0.001$; $F(2,45) = 14.573$; $P < 0.001$ for the males and females respectively). Post-hoc comparisons revealed that, for both the males and the females, that the fitness instructors had significantly lower fat percentages than the regular and non-exercisers. Also, the regular exercisers had a lower fat percentage in comparison to the non-exercisers (see also table 2).

With regard to BMI again significant differences were obtained for the males ($F(2,49) = 8.696$; $P = 0.001$) and the females ($F(2,45) = 4.822$; $P = 0.013$) respectively. Male non-exercisers were found to have significantly higher BMI scores in comparison to the male fitness instructors and regular exercisers ($p < 0.05$). Female fitness instructors, on the other hand, were found to have significantly lower BMI scores than the female regular and non-exercisers.

Finally, no significant differences were obtained for the males with regard to WHR ($F(2,49) = 0.842$; $p = 0.437$) whereas the females did show differences ($F(2,45) = 4.506$; $p = 0.016$). The female fitness instructors appeared to have significantly lower WHR than the female regular and non-exercisers.

Independent samples t-tests revealed that fitness instructors exercised at significantly higher intensities than regular exercisers ($t(64) = -2.0$, $p < 0.05$). No significant difference was found between the two groups with regard to the frequency of exercise (4.31 (sd = 1.53) and 3.86 (sd = 1.03) times per week for the fitness instructors and regular exercisers respectively).

Pearson's Product correlations were performed in order to establish any relationships between the subscales of the PSPP and global physical self-esteem and the body composition measurements for the genders and for the genders and groups separately. For the males significant correlations were found between BMI and physical strength ($r = 0.391$; $p = 0.004$) and between WHR and physical self-worth ($r = 0.279$; $p = 0.045$). For the females BMI correlated significantly with bodily attractiveness ($r = -0.290$; $p = 0.046$), physical condition ($r = -0.327$; $p = 0.023$) and global physical self-esteem ($r = 0.344$; $p = 0.017$). Percentage body fat correlated negatively with bodily attractiveness ($r = -0.371$; $p = 0.009$), physical condition ($r = -0.497$; $p < 0.001$), sports competence ($r = -0.398$; $p = 0.005$), physical strength ($r = -0.376$; $p = 0.009$) and physical self-worth ($r = -0.377$; $p = 0.008$) and positively with global physical self-esteem ($r = 0.397$; $p = 0.005$). When calculating correleations for the males and females in each group only one significant association was found for the non-exercise group. For the male non-exercisers a correlation between BMI and sport competence ($r = -0.521$; $p = 0.046$) was found.

Standard discriminant analysis was executed in an attempt to establish which variables contributed to the classification prediction of group membership. There were three criterion groups (fitness instructors, regular exercisers, non-exercisers) and 13 variables resulting in a two-function structure. A canonical correlation of 0.73 was found indicating that 53.3% of the variance between the 3 groups could be explained by this linear combination of variables. However, only 3 of the 13 dependent variables made a significant contribution to group separation ($\chi^2 = 110.83$; $p < 0.001$): Attractive body, sports competence and percentage body fat. These variables could classify 77% of all cases accurately.

Discussion

This study investigated the physical self-perceptions, and the relationship between self-perceptions and body composition of male and female fitness instructors, regular exercisers and non-exercisers. As expected genders differences were apparent in the physical self-perceptions. That is, the males scored higher on the attractive body, sports competence and physical self-worth sub-scales of the PSPP than the females. However, participation in regular exercise appeared to be related to differences in physical self-perceptions. Fitness instructors, for example, rated their bodily attractiveness, physical condition and physical strength significantly higher and perceived them as more important than the regular and non-exercisers. Also, fitness instructors and regular exercisers had higher levels of physical self-worth and sports competence and perceived sports competence as more important than the non-exercisers.

Relationships between physical self-perceptions and body composition in this study were particularly apparent in the females. For them a higher fat percentage or BMI value was negatively associated with most of the sub-domains of the PSPP. Again, exercise participation affected the relationship between physical self-perceptions and body composition. In this respect, only one association was found for the non-exercisers. For the fitness instructors and regular exercisers, on the other hand, many associations were obtained which were often dependent of gender. It was felt that, for reasons of clarity, that it would be appropriate to discuss each subscale of the PSPP separately.

Body Attractiveness

As predicted males viewed their body as more attractive in comparison to the females. However, only for the females differences were observed between the different groups. Female fitness instructors exhibited significantly higher body

attractiveness scores in comparison to the regular and non-exercisers and their self-perceptions were similar to the male groups. This difference between the female fitness instructors and the regular and non-exercisers might be related to the fact that the female fitness instructors in the present study conformed more to the cultural ideals of what constitutes an attractive body. Their fat percentage, BMI and WHR scores were significantly lower in comparison to the female regular exercisers and the female non-exercisers. Moreover, their fat percentage and WHR were below norms reported in the literature (Heyward & Stolarczyk, 1996; Malina, 1996). Further support for the notion that cultural ideals are important in perceptions of the body in females was provided by the finding that females associated an increased fat percentage and BMI score with higher levels of body dissatisfaction (Bailey *et al*., 1990; Davis *et al*., 1994). Correlations calculated for the females in each group separately showed only a negative correlation between WHR and bodily attractiveness for the female fitness instructors. No relationships were found for the female regular and non-exercisers. No differences were found in body satisfaction for the males in the different conditions (Fallon & Rozin, 1985; Silberstein *et al.*, 1988). The scientific literature on body composition and body satisfaction in males has been equivocal. The use of different inventories for measuring body satisfaction might partially explain this. Additionally, whereas dissatisfaction in females has been associated with the desire to reduce body size (Silberstein et al., 1988), in males this association is more ambiguous. Hence, for some men body dissatisfaction is related to the desire to be thinner whereas other men have the desire to increase their body size by increasing their muscle composition (Drewnowski & Yee, 1987).

Fitness instructors were found to place significantly more importance on body attractiveness in comparison to the regular and non-exercisers. The female fitness instructors viewed body attractiveness also significantly more important than the male fitness instructors. Fitness instructors, in this respect, are often perceived as role models and might feel pressurised in matching up to the physical ideals of society. However, despite the fact that fitness instructors perceive an attractive body as important, they appear not to be overly critical or concerned towards their own body as has been suggested in previous studies (Davis, 1992; Davis & Cowles, 1991; Davis *et al*., 1995). Hence, fitness instructors scored significantly higher on the bodily satisfaction subscale of the PSPP in comparison to the regular and non-exercisers. Moreover, fitness instructors did not differ from the regular exercisers in the number of exercise sessions engaged in during a week.

Physical condition

Fitness instructors also reported higher scores on the physical condition subscale of the PSPP and perceived physical condition as more important than the regular and non-exercise groups. It is likely that through their education fitness instructors have gained greater knowledge about the importance of fitness and how to effectively increase their fitness levels. Fitness instructors in the present study, therefore, are more likely to train responsibly and effectively. This was, for example, reflected in the average number of weekly exercise session participated in by the fitness instructors. Fitness instructors did not differ in the number of exercise sessions in comparison to the regular exercisers but they exercised at higher intensity levels. It has been found that physical condition self-perceptions were the strongest predictor that distinguished exercisers and non-exercisers (Sonstroem *et al*., 1992). However, the current study did not support this observation. No differences were found between the regular and non-exercisers on this scale. Moreover, discriminant analysis did not reveal physical condition as a factor significantly contributing in the prediction of group membership.

Finally, only significant negative correlations were found for the females between physical condition and body fat and BMI indicating that a higher body fat percentage or BMI score was associated with lower levels of the physical condition perceptions. It appears that females in general do not acknowledge the fact that one can be in good physical condition whilst having relatively higher body weight and/or body fat. Or, in other words, one can be fit and fat and being fat and fit appears to be healthier than thin and unfit (Blair *et al*., 1989). Thus, the view that good physical fitness and health is seen to be synonymous with low body fat and body weight is potentially a dangerous one that could result in either excessive exercise participation or dropout or other undesirable behaviours.

Sport competence

The results regarding sport competence were somewhat unexpected. The female non-exercisers scored significantly lower on the sports competence sub-scale than all the other groups. This group together with the regular female exercisers also perceived sports competence as less relevant as indicated by their PIP scores. Competence, normally, is associated with improved self-concept (March & Peart, 1998), and is an important predictor for sustained participation in physical activity and exercise (Ryan *et al*., 1997). Competence is also closely linked with intrinsic motivation (Whitehead & Corbin, 1991). For example, interest and enjoyment of an activity would reinforce perceptions of competence (Deci & Ryan, 1985). In the present study sport competence was also one of the three predictors that significantly contributed to the classification of the participants as either being a fitness instructor, regular or non-exerciser.

Although people have multiple reasons for participating in exercise, including achieving a particular level of competence, it would be advantageous to promote skill learning when designing and implementing exercise programs in order to avoid dropout and increase exercise adherence. This seems to be particularly true for the female non-exercisers in this study.

Females associated increased levels of competence with lower body fat and competence was positively associated with BMI and WHR for the male regular exercisers and BMI for the male fitness instructors. Male regular exercisers and fitness

instructors probably associate competence with a muscular, athletic body shape. The mesomorphic male, in this respect is seen as more physically capable and competent.

Physical strength

Male regular exercisers perceived their physical strength significantly lower as the male non-exercisers and fitness instructors. This might be due to the comparisons made by the participants when completing the questionnaires. Participants were asked whether they felt that they were physically stronger than most people of their gender. It is likely that the male regular exercisers have compared themselves to the more muscular male, therefore this perception was reflected in their scores that they are not as strong as they would like to be. For the females the results were as predicted. Female fitness instructors scored significantly higher than the female non-exercisers and higher, although not significantly, than the regular exercisers for their perceptions on the physical strength sub-scale. Regular exercisers scored higher than the non-exercisers on the physical strength sub-scale. The female non-exercisers did not perceive physical strength as important as the regular exercisers and fitness instructors. This latter finding would, in principle, suggest that the low perceptions of physical strength by the female non-exercisers would have little effect on their global physical self-esteem (discounting). Interestingly, females perceived physical strength to be negatively related to body fat whereas men perceived it to be positively related with BMI. When looking at the different groups male and female fitness instructors associate higher BMI scores with higher levels of physical strength. To fitness instructors a higher BMI score is probably associated with more muscle bulk rather than an excess of body fat. Hence, a negative correlation was found between percentage body fat and physical strength for the female fitness instructors. Regular exercisers, on the other hand, perceived physical strength to be negatively correlated with percentage body fat (males), BMI (males) and WHR (females).

Physical self-worth

Males were found to score significantly higher on the physical self-worth subscale of the PSPP than the females. Males have been found to score significantly higher on all scales of physical self-perceptions including self-worth (Hayes, Crocker, & Kowalski, 1999). It appears, however, that a history of participation in regular physical exercise has a positive association with level of physical self-worth. Intervention studies have also indicated that exercise participation can result in alterations in physical self-perceptions (Caruso & Gill, 1992; Rapoport, Clark, & Wardle, 2000). However, few studies exist that have investigated the role of body composition and/or physical fitness and their change over time on physical self-perceptions. In this respect it has been shown that changes in perceptions may occur through objective feedback without significant physiological or body composition changes (Balogun, 1987). The role of changes in body composition and physical fitness, while engaging in exercise or physical activity, on physical self-perceptions is an area that needs further research.

For males physical self-worth was positively associated with an increased WHR and for females physical self-worth was negatively correlated with percentage body fat. The correlations calculated for the males and females in each group separately only showed a significant relationship between WHR and physical self-worth for the female fitness instructors and the male regular exercisers. The positive correlation for the males and the negative correlation for the females between WHR and physical self-worth illustrates current trends in society in what is being perceived as being physically attractive.

Global physical self-esteem

Despite previous findings that participation in physical exercise brings about small to moderate changes in global self-concept (Fox, 2002 & 2000) no differences in global physical self-esteem were found between the fitness instructors/regular exercisers and the non-exercisers. Surprisingly, for the females in general and for the female regular exercisers global self-esteem was positively correlated with percentage body fat and BMI. This correlation seems to be at odds with other findings in this study and the scientific literature in general. However, a negative correlation was found between global physical self-esteem and WHR for the female fitness instructors and female regular exercisers. For the male fitness instructors, on the other hand, a positive correlation was found between global physical self-esteem and WHR. These associations make sense in the light of what is perceived important in society with regard to bodily attractiveness. The ideal standard of beauty for females is a narrow and lean look (Davis, 1997; Morris, Cooper, & Cooper, 1989; Wiseman *et al*., 1992) which would be associated with a low WHR. For males, on the other hand, the mesomorphic body shape would be preferred which would be associated with increased muscle bulk around the waist and thus relatively higher WHR's.

Conclusion

This study supports previous research in that there are clear gender differences in physical self-perceptions (Hayes *et al*., 1999) and that regular participation in exercise appears to positively related to self-perceptions. For example, fitness instructors and regular exercisers had higher levels of physical self-worth and sports competence than the non-exercisers. Both, physical self-worth and sports competence have been shown to be important factors for a 'life-time' commitment to exercise and/or physical activity (Ntoumanis, 2001) as well as improving levels of global self-esteem (Fox, 2000). Secondly, the body composition measures used in the present study (BMI, WHR, percentage body fat) seem all be relevant

and related to different aspects of physical self-perceptions. This indicates that future studies should take in consideration these different associations.

This cross-sectional study of course can't establish cause and effect but it appears that differences in physical self-perceptions are associated with differences in actual body composition, although gender differences are apparent. For example, the results of the present study support the notion that there appears to be a relationship between body composition and body satisfaction for females but not for males. In this respect, there appears to be a need for more longitudinal/intervention studies which investigate the relationship between physical self-perceptions and changes in body composition whilst engaging in physical activity and/or exercise programs.

Working professionally in the fitness industry also appeared to have an influence on physical self-perceptions as well as appearance. Fitness instructors could, potentially, have a huge impact on individuals turning to the fitness industry for weight reduction, body toning or fitness. It would be desirable that fitness instructors have a high level of personal body satisfaction, that they exercise for reasons as health, fitness and enjoyment, and instil similar practices in their clients (Philips & Drummond, 2001). The present study found high levels of body satisfaction and physical condition in fitness instructors. They have also placed high importance on body satisfaction and physical condition. The real danger here is that fitness instructors might perceive health and fitness to be synonymous with a body that is lean and hipless in females and lean and mesomorphic in males. Hence, the fitness instructors appeared to conform to these standards as indicated by their body composition measurements. Such a view might result in unrealistic expectation and lack of empathy towards overweight clients (Vertinsky, 1985).

Finally, the discriminant analysis revealed that group membership was best predicted by body fat percentage, body attractiveness and sports competence. An extrinsic motivational orientation towards exercise participation like focussing on body attractiveness or reducing body fat, however, is more likely to result in drop-out or undesirable behaviours like exercise addiction (Bamber *et al*., 2000). It is essential, therefore, that fitness instructors develop programs for clients which are focused on health and well being, competence (skill learning) and enjoyment and are conducted in a relatively 'body neutral' environment. Such an approach would propagate a more intrinsically motivated approach to exercise participation and might ultimately have a positive effect on physical self-perceptions in particular and global physical self-esteem in general.

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***Table 1**: Results of the univariate analysis of variance for the subscales of the Physical Self-Perceptions Profile and the Perceived Importance Profile (PIP) of these sub-scales (* $p < 0.05$; ** $p < 0.01$).*

Dependent Variable	Group Main Effect	Gender Main Effect	Interaction Effect
Attractive Body	$F(2,94) = 12.497$ $p < 0.001^{**}$	$F(1, 94) = 5.975$ $p = 0.016^{*}$	$F(2,94) = 7.649$ $p = 0.001^{**}$
Physical Condition	$F(2,94) = 9.972$ $p < 0.001^{**}$	$F(1, 94) = 1.037$ $p = 0.311$	$F(2,94) = 1.593$ $p = 0.209$
Sports Competence	$F(2,94) = 9.370$ $p < 0.001^{**}$	$F(1, 94) = 4.539$ $p = 0.036^{*}$	$F(2,94) = 5.051$ $p = 0.008^{**}$
Physical Strength	$F(2,94) = 8.211$ $p = 0.001^{**}$	$F(1, 94) = 0.006$ $p = 0.941$	$F(2,94) = 7.900$ $p = 0.001^{**}$
Physical Self-Worth	$F(2,94) = 7.129$ $p = 0.001^{**}$	$F(1, 94) = 4.066$ $p = 0.047^{*}$	$F(2,94) = 1.226$ $p = 0.298$
PIP Attractive Body	$F(2,94) = 21.259$ $p < 0.001^{**}$	$F(1, 94) = 0.177$ $p = 0.674$	$F(2,94) = 5.487$ $p = 0.006^{**}$
PIP Physical Condition	$F(2,94) = 14.272$ $p < 0.001^{**}$	$F(1, 94) = 1.383$ $p = 0.242$	$F(2,94) = 2.892$ $p = 0.060$
PIP Sports Competence	$F(2,94) = 4.552$ $p = 0.013^{*}$	$F(1, 94) = 13.437$ $p < 0.001$	$F(2,94) = 4.419$ $p = 0.015^{*}$
PIP Physical Strength	$F(2,94) = 6.725$ $p = 0.002^{**}$	$F(1, 94) = 0.254$ $p = 0.615$	$F(2,94) = 8.196$ $p = 0.001^{**}$
Global Physical Self-esteem	$F(2,94) = 2.862$ $p = 0.062$	$F(1,94) = 0.499$ $p = 0.482$	$F(2,94) = 0.623$ $p = 0.539$

Table 2: *Mean scores, by gender and group, for the sub-scales of the Physical Self-Perceptions Profile, the subscales of the Perceived Importance Profile (PIP), physical self-worth and the body composition measurements.*

Dependent Variable	Fitness Instructors Male	Fitness Instructors Female	Regular Exercisers Male	Regular Exercisers Female	Non Exercisers Male	Non Exercisers Female
Body Attractiveness	16.15	18.00	15.75	11.92	15.73	12.55
Physical Condition	17.60	18.13	15.41	15.08	15.60	13.35
Sport Competence	17.40	18.88	18.82	16.58	16.60	12.60
Physical Strength	15.75	17.00	12.47	14.50	16.40	13.25
Physical Self-worth	17.35	17.25	16.71	15.50	15.80	13.50
PIP Body Attractiveness	5.85	6.93	5.00	4.83	5.13	4.50
PIP Physical Condition	6.25	7.00	5.18	6.00	5.20	4.60
PIP Sport Competence	5.95	6.06	6.35	4.75	5.89	3.95
PIP Physical Strength	5.50	5.75	4.47	5.33	5.33	3.85
Global Physical Self-esteem	-1.25	-1.75	-0.37	-1.56	-0.09	-0.23
Body Fat	9.27	21.08	16.46	24.77	23.65	28.21
BMI	23.64	21.64	22.15	24.12	25.04	24.30
WHR	0.806	0.726	0.786	0.755	0.793	0.767