

Physical self-perceptions of women with rheumatoid arthritis.

A MacSween <sup>1</sup>, G Brydson <sup>1</sup> AND K R Fox <sup>2</sup>

<sup>1</sup>Alasdair MacSween, Ph.D., Gillian Brydson, M.Sc.: Division of Physiotherapy, Glasgow Caledonian University, Glasgow; <sup>2</sup> Kenneth R Fox Ph.D.: Department of Exercise and Health Sciences, Bristol University, Bristol.

**Address for reprint requests:**

Dr Alasdair MacSween, Ph.D., B.Sc. (Hons), MCSP,  
Physiotherapy Subject Area,  
School of Health Sciences,  
Queen Margaret University College,  
Leith Campus,  
Duke Street,  
Edinburgh EH6 8 HF

**Corresponding author**

Dr. Alasdair MacSween

Tel +44(0)131-317-3816

Fax +44(0)131-317-3815

Email [amacsween@qmuc.ac.uk](mailto:amacsween@qmuc.ac.uk)

*Objective.* Research shows that physical self-perceptions relate to exercise adherence and aspects of mental well-being. The reliability and validity of the Physical Self-Perception Profile (PSPP) and the Perceived Importance Profile (PIP) and relationships between these scales and disease, function and negative affect in RA patients are reported.

*Methods.* 52 women (mean age 48.4, SD 10.4) completed the PSPP, PIP and other measurements: The core measures of EULAR; The Hospital Anxiety and Depression Scale (HADS); distance walked, peak and extrapolated maximal oxygen consumption during a 10m Shuttle Walk Test.

*Results.* PSPP sub-scales: high internal consistency (Chronbach's alpha 0.73 - 0.81) and factor structure; strong relationships with Physical Self-Worth (PSW) (correlation coefficients 0.40 - 0.63); multiple regression - all subscales (except Sport) significantly contributed to PSW variance (Rsquared 59.1 %). Very low PSPP scores, particularly for Strength and Sport competence, and PIP scores were observed (significantly lower than US college aged and obese women) which was reflected in low PSW. Aspects of PSPP were related to depression and swollen joint count but not functional fitness. Discrepancy scores were associated with lower PSW ( $r = 0.48$ ) substantiating that subjects were unable to meet their perceptual needs concerning their physical selves.

*Conclusion.* This indicates the PSPP and PIP are both reliable and valid and are sensitive to significant constructs in the mental health of women with RA. The PSPP appears to measure distinct mental properties not represented in other common RA measures; hence they may be useful in measuring an important aspect of RA patients' psychology.

**KEY WORDS.** Rheumatoid Arthritis; Self-concept; Body Image.

Patients' perceptions are an important outcome of clinical treatment and satisfaction, confidence, mental well-being and life quality have all become important targets. Specifically, self-esteem has been identified as a key component of mental health as well as a determinant of a range of health behaviours (1) and so warrants further attention in the therapeutic setting. In recent years, significant advances in our understanding of the nature and construction of the self have taken place. In particular, it has become clear that the self is multidimensional and possibly hierarchically organised (2). Individuals make global judgements of their self-worth, or esteem, based upon the quality of their interactions in several life domains such as work, family, and social life. A number of instruments have been developed to simultaneously assess adult's self-perceptions in these domains such as Harter's Self-Perceptions Profile for Adults (3) and Marsh's Self-Description Questionnaire III (4). One dimension that has consistently emerged as being closely related to global ratings of self-esteem is perceptions of the physical self (5). Specific interest in the detailed construction of the physical self began in the late 80s with the development of the Physical Self-Perception Profile (PSPP) (6) and later by Marsh and colleagues with the Physical Self-Description Questionnaire (7). The PSPP, a multidimensional instrument, extended Harter's work and was designed to assess five critical components of physical self-perceptions: body image, perceived sport competence, physical strength, physical condition and physical self-worth - the latter being seen as a super-ordinate construct in a hierarchical structure (8). Physical self-worth has been shown to be directly associated with indicators of emotional adjustment, regardless of self-esteem levels and socially desirable responding, having mental well-being properties in its own right (9). Previous research in a range of populations, not including those with rheumatic diseases, indicates that these sub-domains

contribute to the overall judgement of physical self-worth, which in turn contributes, substantially in most populations ( $r = 0.6-0.7$ ), to global self-esteem (10).

Several theorists and researchers have also suggested that in order to fully understand the influence, on self-esteem, of experience in different life domains it is also useful to consider the importance that the individual places on those domains. For example, performance at work may not be as important and as critical to self-esteem as a harmonious family life for some individuals and vice versa. Harter (11,12) suggested that in order to experience higher self-esteem individuals need to match their aspirations with their perceived level of competence, or success, in each domain. Where this does not occur discrepancies between the desired and perceived self may result and this may contribute to lower self-esteem. Harter has shown that individuals may use the self-serving process of 'discounting' the importance of domains where they do not perceive that they are particularly competent and attach higher importance to areas where they experience regular success. To address these tenets the Perceived Importance Profile (PIP) (8) was devised for use in conjunction with the PSPP. The PIP allows the individual to rate the importance of success in different sub-domains in terms of self-esteem enhancement. The concepts evaluated in the PSPP and PIP and their postulated relationship to self-esteem is illustrated in Figure 1. The hierarchical structure depicted has been established in several samples using structural equation modelling (10).

Insert Fig.1 about here

The functioning of this importance filter between physical self-perception and self-esteem can be quantified through calculation of discrepancy score. These assess the degree of mismatch between levels of competence and the importance to the individual of being competent in each element. Discrepancy scores have been negatively related to both physical worth and global self-esteem. Perceived competence and importance scores have also been predictive of physical activity participation (13). Therefore the PSPP and PIP can potentially provide a rich source of information about an individual's state of mind regarding their body and their physical capabilities. Clinical groups have already been studied (14, 15), however, this is restricted primarily to those suffering from psychiatric disorders and there are no previous studies of people with Rheumatoid Arthritis (RA). Given the profound impact of RA on physical function and the potential value of physical self-perceptions in both rehabilitation and clinical management these concepts are worthy of investigation. This study therefore set out to provide a) initial reliability and validity data on the PSPP and PIP, and b) descriptive data on physical self-perceptions and their relationship with measures of disease status, function and negative affect in women with RA.

## **PATIENTS AND METHODS**

### Location and Ethics

The study was conducted in the Physiotherapy Department of North Glasgow University Hospitals, Glasgow Royal Infirmary NHS Trust (GRI). The ethics committees of both Glasgow Caledonian University (GCU) and GRI granted ethical clearance.

### Sample

Fifty-two female patients with a confirmed diagnosis of classical or definite RA (diagnostic index criteria of the Centre for Rheumatic Diseases GRI) with consideration of defined selection criteria were recruited through the outpatient clinic. Subjects were recruited for a prospective study of an aerobic exercise intervention (16). Inclusion criteria were; aged between 30 and 70, and Steinbrocker functional class I or II (17). Exclusion criteria were; unstable RA medication regimes and/or medications affecting cardiac function, co-morbidity contraindicating exercise, or cognitive impairment preventing informed consent.

In order to evaluate the PSPP and PIP scores in the context of disease status and function of women with RA, a range of physical and psychological measurements were taken.

## Physical measures

Disease status. RA status was assessed with the core measures developed by the American College of Rheumatologists and recommended in the Eular Handbook of Standard Methods (18). These appear frequently in studies of RA and are:

Erythrocyte Sedimentation Rate and Plasma C-Reactive Protein levels (Biochemical indicators of inflammatory activity); Ritchie Articular Index (count and rating of joint tenderness in response to standardised palpation); Total Swollen Joint Count; Patients Assessment of Disease Activity (patients complete a Visual Analogue Scale – VAS - anchored at, ‘Extremely active’ and ‘Not active at all’); Physician Assessment of Disease Activity (5 point scale from, ‘asymptomatic’ to ‘very severe’); Duration of Early Morning Stiffness (patient self-report); Joint Pain (patients complete a VAS rating their Pain).

Walking Ability. This was assessed as performance on a symptom limited maximal 10m incremental Shuttle Walk Test (SWT), © The Glenfield Hospital, Leicester and Loughborough University 1992 (19, 20). The number of shuttles completed, heart rate and oxygen uptake calculated by Cosmed K4b<sup>2</sup>™ software were recorded (a Cosmed K4b<sup>2</sup>™ portable respiratory gas analyser with associated software measuring oxygen uptake breath by breath was employed).

Functional capacity. This was calculated as peak oxygen consumption rate ( $\dot{V}O_{2\text{peak}}$ ) achieved during the SWT.

Aerobic power. This was calculated as a linear extrapolation of the heart rate/oxygen consumption data from the SWT to age predicted maximum ( $\dot{V}O_{2\text{max}}$ ). The method has been described in full elsewhere (21, 22).

## Psychological measures

Physical self-perceptions. The Physical Self-Perception Profile (PSPP) (6, 8) is a 5 sub-scale 30-question instrument designed to assess perceptions in four sub-domains of the physical self: Perceived Sports Competence (Sport), Perceived Body Attractiveness (Body), Perceived Physical Strength (Strength) and Perceived Physical Condition (Condition). In addition a separate sub scale, Physical Self-Worth (PSW), assesses higher order perception of physical self worth, an integration of the combined effect of the other four self-perception sub-domains. This instrument has been widely reported in the social psychological and sport psychology literature and has been translated into at least 11 languages (5, 6, 8, 14, 15).

Perceived importance. In an attempt to incorporate personal weightings of importance of sub-domain self perceptions to more global constructs such as self-esteem, the Perceived Importance Profile (PIP) (8) was also administered. This allows a statement of importance, using a two-question sub-scale for each of the four sub-domains, to overall physical self-worth and self-esteem. This measure allowed a test of the impact of competence-importance discrepancies on self-esteem and the presence of discounting of sub-domains yielding low competence (11).

Depression and anxiety. The Hospital Anxiety and Depression Scale (HADS) (23) has been widely used in clinical settings to assess current level of depression and anxiety.

## Protocol

Participants were welcomed, issued an information sheet and they signed a consent form. Height and weight were recorded. All measures of the core EULAR set were



taken (with exception of Erythrocyte Sedimentation Rate (ESR) and C Reactive Protein Levels (CRP)) followed by the administration of the PSPP, PIP and HADS. Participants then listened to the pre-recorded instructions for the walking test and were asked if they understood and were willing to proceed with the test. The Cosmed K4b<sup>2TM</sup> was calibrated to ambient temperature and humidity (as manufacturer's instructions), and then fitted to the participant. Participants were free to stop whenever they wished but standardised instructions to keep going as long as possible were given. The Cosmed K4b<sup>2TM</sup> was removed and the participants' rested for a period if required. Blood samples were then drawn for analysis of ESR and CRP.

#### Statistical analyses

Summary statistics were calculated for each of the sub-scales in the PSPP, PIP and the HADS. As there is an absence of published data from a comparable RA group the PSPP and PIP scores for the sample were compared with data from samples of American college aged and overweight/obese females (8) using One-Way ANOVA and Bonferroni Post-Hoc testing (where appropriate). The internal consistency of different items within each sub-domain was quantified by Cronbachs alpha (24). Further checks of content validity were performed: principal components factor analysis (using oblique rotation) of the PSPP sub-domain subscales and correlation and stepwise multiple regression of PSPP sub-domain scores against PSW score. Competence-importance discrepancy scores were calculated with the method advocated by Messer and Harter (3) and Fox (8). Correlation analysis was employed to test the strength and significance of any linear relationships between PSPP sub-

scale scores and measures of disease status, aerobic fitness, walking ability and HADS scores.

## RESULTS

The final sample comprised 52 females with a mean age of 48.4 (Standard Deviation - SD - 10.4) years. Mean body mass index was 27.3 (SD 5.3), with 38.5% classed as overweight and 25.0% as obese. Mean duration of disease was 10.3 (SD 8.1) years. Although all participants completed the PSPP and PIP, ten did not complete the core EULAR measures and the HADS (due to logistical difficulties), reducing the sample for related analyses to 42 participants.

### Physical self-perceptions and perceived importance

High internal consistency and factor structure was demonstrated as Chronbach's alpha for PSPP sub-scales ranged between 0.73 and 0.81. This supports the assertion that the previously demonstrated reliability of the PSPP was reproduced in a sample of women with RA. Principal component factor analysis confirmed the four-factor structure of the sub-domain sub-scales with each item loading on its intended factor. Even with this relatively small sample size, the instrument seems to produce clearly defined and internally consistent sub-scales with this clinical population.

Summary statistics for the PSPP sub-domains, PIP and HADS are presented in Table 1. The PSPP and PIP scores for the RA subjects were compared with data from samples of American college aged females ( $n = 431$ ) and overweight/obese females ( $BMI > 28$ ,  $n = 422$ ) with a mean BMI of 36 and mean age of 41 years (8). For all scores there were significant differences between the three groups ( $p < 0.001$ ) and the significant differences between the RA sample and the comparator groups are detailed in Table 1.

Insert Table 1. about here

It can be seen that the RA sample (as did the obese females, with the exception of the Body and Strength PIP) scored significantly lower in all PSPP and PIP sub-scales than college aged females. The RA subjects perceived Sport Competence and Strength scores were also significantly lower than obese females and close to the minimum possible; while Physical Condition and overall PSW were similar to obese females and Body Attractiveness was significantly higher. The importance of Attractive Body and Physical Strength was significantly lower than obese females, while the importance of Sport and Condition was similar.

The relationship between the PSPP subscales and PSW was evaluated in order to assess their contribution to this higher order construct. The resultant correlation coefficients were all significant; for Condition ( $r = 0.55$ ), Body ( $r = 0.63$ ), and Strength ( $r = 0.58$ ) at  $p < 0.001$  and for Sport ( $r = 0.40$ ) at  $p < 0.01$ . Stepwise multiple regression revealed that with the exception of Sport, all sub-scales significantly and independently contributed to the  $R^2$  value of 59.1 % of explained variance in PSW (Condition and Body  $p < 0.001$ , Strength  $p < 0.05$  and Sport  $p = 0.642$ ). This is a slightly lower explained variance than has been observed with other populations suggesting that other factors that were not measured here may also contribute to physical self-worth in patients with RA. The low contribution of Sport was further supported by the low PIP Sport score and the combination of low competence and importance scores suggest that perceptions in this domain are unlikely to influence higher order constructs of self-worth.

Discrepancy scores represent the mismatch between an individual's aspirations and their perceived competence. In this sample the correlation between total discrepancy in the four PSPP sub-domains and scores on the PSW sub-scale was  $r = 0.48$  ( $p < 0.01$ ). The scatter plot featured in Figure 2 demonstrates the spread of scores and substantiates that a portion of physical self-worth may be determined by RA patients' feelings that they are unable to meet their perceptual needs.

Insert Figure 2. about here

The correlation coefficients between the PSPP sub-scales and the other measures are presented in Table 2; only those relationships that were significant are presented. Physical self-perceptions were significantly related to only two of the measures of disease status and not to any of the measures of fitness; indicated by the negative weak to moderate correlations between the Swollen Joint Count and levels of perceived Strength, Condition and Sports competence and between Sport competence and ESR. The only other significant correlations lay between the depression aspect of negative affect - the depression subscale of the HADS – and the Condition and PSW subscales.

Insert Table 2. about here.

## **DISCUSSION**

The aims of this study were twofold; first to establish the PSPP and PIP as internally reliable and valid instruments with a RA sample and second to analyse the levels of physical self-perceptions and their relationship with measures of disease, function, and negative affect in women with RA.

Administration of the PSPP and PIP in this sample was found to be straightforward with no participants reporting difficulties in completing or understanding the questions. The reliability coefficients, factor structure, and relationships among PSPP and PIP sub-scales observed here, suggest that the instrumentation functions equally well with RA subjects, as it does in other populations in which it has been applied (5, 8, 14, 15). Similarly, the pattern of mean sub-scale scores was logical when compared to that seen in other populations and provides further evidence of construct validity. The content of the four sub-domains appeared salient to RA subjects, in that all four correlated significantly with PSW and as a set of constructs, explained almost 60% of variance in PSW. This is a slightly lower explained variance than has been observed with other populations suggesting that other factors that were not measured here may also contribute to physical self-worth in patients with RA; further study would be necessary to confirm this.

On the basis of the data presented here, the physical self-perceptions of women with RA are extremely low when compared to healthy college aged women and also clinically obese women – the latter being a similar age to the RA patients studied (8). The RA subjects scored significantly lower on all PSPP sub-scales than the college

aged females and significantly lower in Sport and Strength domains than the obese group. The RA subjects extremely low mean score on perceived Strength was particularly noticeable. In the context of the consistently low scores observed in all aspects of physical self-perception this may well reflect a lack of confidence caused by a perceived loss in functional aspects of fitness in addition to any actual loss of strength experienced. This lack of confidence may also be reflected in the similarly low Sport competence score, although, there is some evidence of discounting the importance of Sport competence, reducing its impact on self-worth (8, 12). Overall Physical Self-Worth, the global view of the physical self, was also very low and close to that of the obese group. This may again reflect an overall lack of confidence in the physical aspects of the self as a result of disease. This theory is supported by the significant negative correlations between the HADS depression score and both PSW and Condition. Furthermore, low PSPP scores have previously been seen to be related to low self-esteem and other aspects of mental well-being in a range of populations (9, 14). Interestingly in the Body domain RA subjects did score significantly higher than the obese females. This, however, reflects the profound depth of the obese subjects' negative responses, in this particular domain, rather than any positive finding for the RA subjects.

Again, on the basis of the present evidence, RA patients attach lower importance to aspects of the physical domain than is typically seen in other populations; this is evident in comparison with college females and to a lesser extent with obese females. The RA subjects' ratings of importance being significantly lower than the college aged females in all domains and significantly lower than the obese females in Body and Strength domains. Although this is preliminary data, from a relatively small

sample, it may be that this is an indicator that women with RA are discounting (8, 12) the importance of physical competence and appearance. To substantiate this finding further research, with measures of self-perceptions in other domains, is recommended. The importance scores were not sufficiently low, however, to avoid discrepancies between the desired and perceived self in some domains for some of these women. These discrepancies were negatively associated with physical self-worth. Although there was some evidence of discounting low competence, this only occurred in the Sports sub-domain. Low perceived Strength and Condition, in particular, combined with (relatively) high importance ratings, appeared to contribute to low PSW. It may be the case, that clinical populations who suffer from physical difficulties, such as those with RA, cannot discount their need and desire for higher competence in aspects such as physical strength and condition. This may well reflect their desire to reach normal levels and become healthy again. Given that PSW has been associated with indices of emotional and mental well-being, independent of self-esteem, and socially desirable responding (9), this may be an important therapeutic finding. Strategies for improving confidence and competence may help increase physical self-worth and subsequently mental well-being and aid with coping with RA.

In the analysis of the relationships between how women with RA perceive themselves in physical terms and measures of their disease, function and negative affect it was seen that three of the PSPP sub-scales (Strength, Sport and Condition) were significantly related to the clinical measure of Swollen Joint Count (SWJ). This may indicate that patients utilise this variable as a salient statement of their condition and that it is significantly related to their physical self-perceptions. Nevertheless it was surprising that SWJ, a very outward physical manifestation of the disease, did not



correlate with Body score and the results show stronger relationships between SWJ and the self-perception domains related to functioning rather than appearance. Perhaps this arose from either the relatively low importance the subjects allocated to Body in the PIP results (the RA subjects rated this factor significantly lower in importance than did either of the two comparator groups); or the fact that not all the joints that are scored in the EULAR SWJ are visible to others. Measures of depression were also significantly related to two sub-scales - PSW and Condition. It therefore appears that physical self-perceptions are more closely related to certain direct markers of the disease (SWJ and ESR) and negative affect (HADS depression score) rather than measures of function and fitness. This supports previous literature showing that positive changes in physical self-perceptions, which often accompany exercise (25), are not usually related to measures of functional fitness. While no data was collected here to allow a direct comparison of the fitness of RA and normal subjects, several previous studies have reported both similar low values for the measures of fitness reported here and markedly reduced fitness in RA subjects over both their age matched normal and osteoarthritic peers (26, 27, 28, 29). Lack of fitness, exercise and the accompanying absence of pride and confidence in the body may have its impact on reduced mood experienced in depression in RA subjects.

Conclusions. The conclusions are made with the caveat that the present sample is relatively small and this is the first published study of these instruments applied in a RA sample. The evidence presented here indicates, however, that the PSPP and PIP are reliable and valid instruments that are sensitive to important constructs in the mental health of women with RA. The PSPP appears to measure distinct mental properties not represented in other measures previously employed in evaluating RA

patients. This study also provides evidence of reduced physical self-perceptions in RA subjects. Physical self-perceptions have been shown to be related to adherence and persistence in physical activity as well as aspects of mental well-being; evidence that they are important in both the rehabilitative process and clinical management and therefore should not be overlooked in the care of patients with RA.

## REFERENCES

1. Campbell RN. The new science: Self-esteem psychology. Lanham, MD: University Press of America; 1984.
2. Marsh HW, Hattie J. Theoretical perspectives on the structure of self-concept. In: BA Bracken Ed. Handbook of self-concept. New York, NY: Wiley; 1996:38-39.
3. Messer B, Harter S. Manual for the Adult Self-Perception Profile. Denver, CO: University of Denver; 1986.
4. Marsh HW. Self-description questionnaire III: Manual. Sydney: Publication Unit Faculty of Education University of Western Sydney; 1992.
5. Fox KR. The physical self and processes in self-esteem development. In: KR Fox Ed. The physical self: From motivation to well-being. Champaign, IL: Human Kinetics; 1997:111-139.
6. Fox KR, Corbin CB. The Physical Self-Perception Profile: Development and preliminary validation. *Journal of Sport and Exercise Psychology* 1989; 11:408-430.
7. Marsh HW, Richards GE, Johnson S, Roche L, Tremayne P. Physical self-description questionnaire: Psychometric properties and a multi-trait multi-method analysis of relations to existing instruments. *Journal of Sport and Exercise Psychology* 1994;16(3): 270-305.
8. Fox KR. The Physical Self-Perception Profile Manual. Office for Health Promotion, Northern Illinois University: DeKalb; 1990.
9. Sonstroem R J, Potts SA. Life adjustment correlates of physical self-concepts. *Med Sci Sports Exerc* 1996;28(5):619-625.

10. Sonstroem R.J. Physical self-concept: Assessment and external validity. *Exerc Sport Sci Rev* 1998;26:133-164.
11. Harter S. Processes underlying the construction, maintenance and enhancement of the self-concept in children. In: Suls J and Greenwald AG Eds. *Psychological perspectives on the self; Volume 3*. Hillsdale, NJ: L Erlbaum; 1986:137-181.
12. Harter S. Causes, correlates, and the functional role of global self-worth: A life-span perspective. In: RJ Sternberg and J. Kolligian, Jr. Eds. *Competence considered*. New Haven, CT: Yale University; 1990:67-97.
13. Marsh HW, Sonstroem RJ. Importance ratings and specific components of physical self-concept: Relevance to predicting global components of self-concept and exercise. *Journal of Sport and Exercise Psychology* 1995;17:84-104.
14. Van de Vliet P, Knapen J, Onghena P, Fox, K.R, Van Coppenolle H, David A. Assessment of physical self-perceptions in normal Flemish adults versus depressed psychiatric patients. *Pers Individ Dif* 2002;32(5):855-863.
15. Van de Vliet P, Knapen J, Onghena P, Fox K.R, David A, Morres I, et al. Relationships between self-perceptions and negative affect in adult Flemish psychiatric in-patients suffering from mood disorders. *Psychology of Sport and Exercise* 2002:309-322.
16. MacSween A. An investigation of the efficacy of a hydrotherapy and land based aerobic exercise programme for female Rheumatoid Arthritis patients [dissertation]. Glasgow: Glasgow Caledonian University; 2003.
17. Steinbrocker O, Traeger CH, Batterman RC. Therapeutic criteria in rheumatoid arthritis. *JAMA*1949;140(8):659-662.

18. Scotte DC, van Riel PL, van der Heidje D, Benke AS. The EULAR handbook of standard methods, assessing disease activity in Rheumatoid Arthritis. Vienna: EULAR, 1993.
19. Singh SJ, Morgan MDL, Scott S, Walters D, Hardman AE. Development of a shuttle walk test of disability in patients with chronic airway obstruction. *Thorax* 1992;47:1019-24.
20. Singh SJ, Morgan MDL, Hardman AE, Rowe C, Bardsley PA. Comparison of oxygen uptake during a conventional treadmill test and the shuttle walking test in chronic airflow limitation. *Eur Respir J* 1994;7:2016-20.
21. MacSween A. The reliability and validity of the Åstrand nomogram and linear extrapolation for deriving  $VO_{2max}$  from submaximal exercise data. *J Sports Med Phys Fitness* 2001;41(3):312-7.
22. MacSween A, Brydson G, Creed G, Capell HA. A preliminary validation of the 10m incremental Shuttle Walk Test as a measure of aerobic fitness in female Rheumatoid Arthritis patients. *Physiotherapy* 2001;87:38-44.
23. Zigmond AS, Snaith RP. Hospital Anxiety and Depression Scale. *Acta Psychiatr Scand* 1983;67:361-70.
24. Cronbach LJ. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951;16:297-334.
25. Fox KR. The effects of exercise on self-perceptions and self-esteem. In: SJH Biddle, KR Fox and SH Boutcher Eds. *Physical activity and psychological well-being*. London: Routledge; 2000.
26. Ekblom B, Lovgren O, Alderin M, Fridstom M, Satterstom G. Physical Performance in Patients with Rheumatoid Arthritis. *Scand J Rheumatol* 1974;3:121-125.

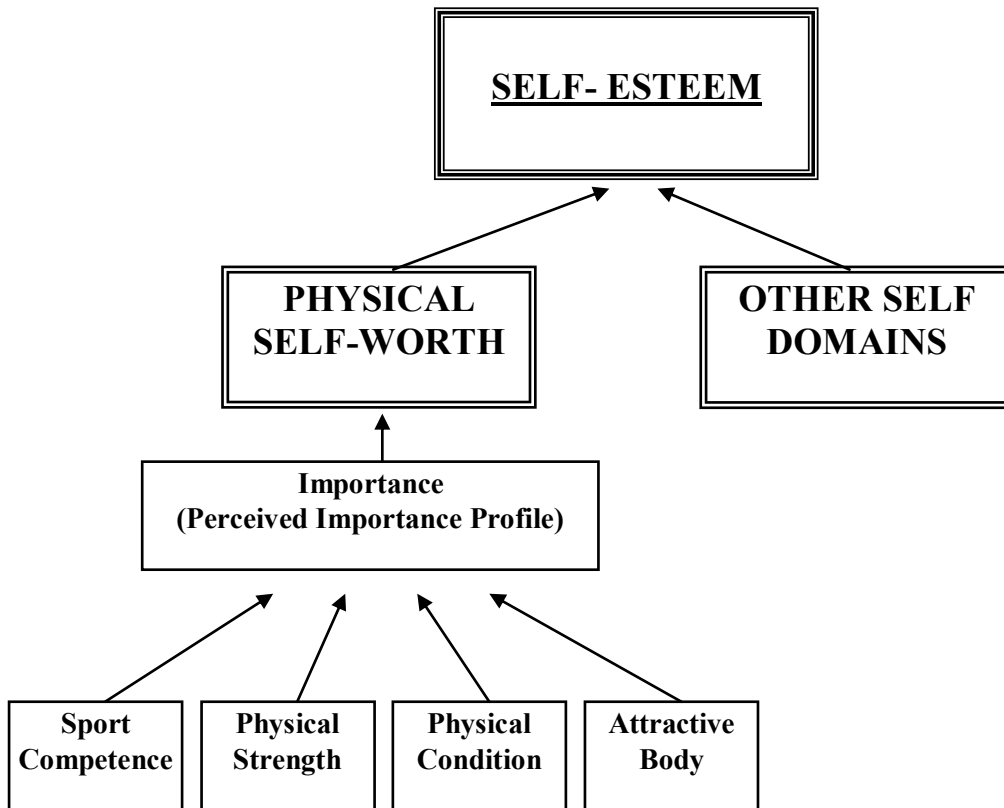
27. Beals CA, Lampman RM, Banwell BF, Braunstein EM, Albers JW, Castor CW. Measurement of exercise tolerance in patients with Rheumatoid Arthritis and Osteoarthritis. *J Rheumatol* 1985;12(3):458-461.
28. Minor MA, Hewett JE, Webel RR, Dreisinger TE, Kay DR. Exercise tolerance and disease related measures in patients with Rheumatoid Arthritis and Osteoarthritis. *J Rheumatol* 1988;15:905-911.
29. Ekdahl C, Broman G. Muscle strength, endurance and aerobic capacity in rheumatoid arthritis: a comparative study with healthy subjects. *Ann Rheum Dis* 1992;51:35-40

**Table 1. PSPP and PIP scores (mean and standard deviation) for; RA, US college aged and obese females and significant differences between the RA and the comparator groups\***

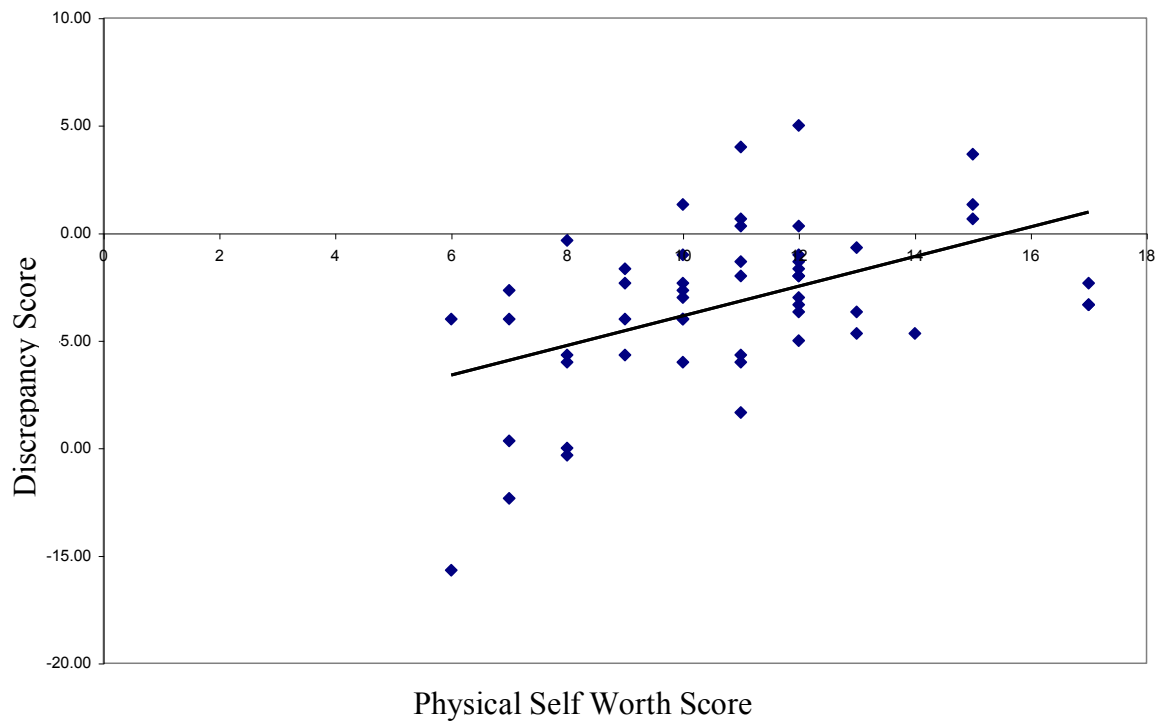
<b>PSPP</b>	<b>RA females</b> n = 52	<b>US College females</b> n = 431	<b>Obese females</b> n = 422
Sport † ‡	9.3 (2.6)	14.2 (4.3)	11.3 (3.7)
Condition †	10.6 (3.0)	14.4 (4.1)	10.3 (3.1)
Body † ‡	10.6 (2.8)	13.3 (4.3)	8.6 (2.6)
Strength † ‡	9.8 (2.9)	14.7 (3.7)	13.5 (3.9)
PSW †	10.9 (2.7)	14.2 (3.8)	10.6 (3.1)
<b>PIP</b>	<b>n = 52</b>	<b>n = 279</b>	<b>n = 411</b>
Sport †	3.5 (1.4)	4.6 (1.6)	4.0 (1.4)
Condition †	4.6 (1.3)	5.4 (1.5)	5.0 (1.4)
Body † ‡	4.4 (1.1)	5.8 (1.3)	5.8 (1.3)
Strength † ‡	4.3 (1.3)	5.1 (1.3)	4.9 (1.4)
* PSPP = Physical Self-Perception Profile; PIP = Perceived Importance Profile; RA = Rheumatoid Arthritic; PSW = Physical Self Worth.			
† = RA significantly different to College aged at $p < 0.05$ ; ‡ = RA significantly different to Obese at $p < 0.05$			

<b>Table 2. Correlation Co-efficients for significant linear relationships between the PSPP sub-scales and other measures for RA females n = 42</b>			
	<b>SWJ</b>	<b>ESR</b>	<b>HDep</b>
PSW			-0.307 ‡
Sport	-0.395 †	-0.350 ‡	
Cond	-0.306 ‡		-0.466 †
Body			
Strength	-0.443 †		
<p>* PSPP = Physical Self-Perception Profile; SWJ = Swollen Joint Count;  ESR = Erythrocyte Sedimentation Rate (mm.hr<sup>-1</sup>); HDep = Hospital Anxiety  and Depression Scale Depression Score; PSW = Physical Self Worth.  † = Significant at p &lt; 0.01, ‡ = Significant at p &lt; 0.05</p>			





**Figure 1.** Hierarchical structure of physical self-perceptions, importance and self-esteem.



**Figure 2.** Scatter plot of Physical Self Worth score versus discrepancy/adequacy score, with line of best fit (Least Squares method).