

5 The effects of exercise on self-perceptions and self-esteem

Kenneth R. Fox

Background

Volumes of research have been generated on the topic of self-esteem and self-concept to the point where it is difficult to find a psychological construct that has attracted more academic attention. Self-esteem is also one of the few psychological terms that has acquired a meaning among the general public. It regularly crops up in informal conversations, usually in the context of explaining particular mental states and behaviours. Reference to self-esteem also features in formal policy documents of a range of organisations and institutions. The National Curriculum for schools in England and Wales, for example, places enhancement of self-esteem as a major curricular goal. Corporations include improvement in mental well-being and self-esteem as an important target for the welfare of their workforce. Health interventions, particularly programmes to facilitate rehabilitation from substance abuse, acute and chronic injury and disease, often focus on improved self-esteem as a primary objective. More recently, self-esteem has been considered as an important aspect of quality of life and mental well-being and as such has been considered as a possible target for public health campaigns.

Why is so much significance attached to a phenomenon that merely exists in the mind of the individual as a mental abstraction? Several features make self-esteem and other self-perception constructs very relevant to health.

- Self-esteem is widely accepted as a key indicator of emotional stability and adjustment to life demands. High self-esteem has been related to a range of positive qualities such as life satisfaction, positive social adjustment, independence, adaptability, leadership, resilience to stress, and high level of achievement in education and work. Self-esteem has emerged therefore as one of the strongest predictors of *subjective* well-being (Diener, 1984) and is consequently an important element of mental well-being and quality of life.
- Self-esteem and related self-perceptions are closely implicated with choice and persistence in a range of achievement and health behaviours.

Many contemporary theories of human motivation feature elements of the self. Needless to say, we enjoy feeling good about ourselves and it is clear that we tend to gravitate to those settings in life which provide opportunities for high self-ratings. High self-esteem is associated with healthy behaviours (particularly in adolescents) such as not smoking, lower suicide risk, greater involvement in sport and exercise, and healthier eating patterns (Torres & Fernandez, 1995). Self-esteem and self-perceptions of ability are therefore critical to understanding determinants of health behaviours and this is evident in patients in the primary care setting (Hurst, Boswell, Boogard, & Watson, 1997).

- Low self-esteem is closely related to mental illness and absence of mental well-being. It frequently accompanies depression, trait anxiety, neuroses, suicidal ideation, sense of hopelessness, lack of assertiveness and low perceived personal control. Improved self-esteem has therefore been used frequently as a target for change and also as a success marker for psychotherapy (Wylie, 1979).

In essence, beyond the satisfaction of basic physiological needs such as food and warmth, there is little of more importance to an individual than maintaining a high degree of self-esteem. The search for self-esteem is considered so strong that it has been termed by Campbell (1984) as the First Law of Human Nature and many theorists believe that sense of self is central to the possession of mental and even physical health.

Self-esteem and the self-system

In order to meaningfully overview the literature on exercise and its impact on self-esteem, it is necessary to first unravel the tangle of constructs involved. The self is best described as a complex system of constructs. Theorists believe that these may be organised by a *self director* who acts as an information processor and decision maker. Information relevant to the self is gathered and organised to form a self-description, termed *self-concept*, *identity*, or *set of identities* based on its abilities, qualities, traits and the roles it performs. Murphy (1947, p. 996) describes the self-concept as 'the individual as known to the individual'. Roles in several life domains may contribute to the self-concept and might include perceptions of self at work, in social relationships, in the family, and also the physical self which is dictated by qualities related to our appearance and physical prowess.

The self director will invest time in directing choice and persistence in activities and use a range of self-promotion and self-presentation strategies (including self-serving biases and defensiveness) to achieve the best results for self. The bank balance at the end of the day constitutes *self-esteem* or *self-worth*. Whereas self-concept is a self-description, *self-esteem is a self-rating of how well the self is doing*. Campbell (1984) defines it as 'an awareness of good possessed by self'. The criteria and content used to determine

worth are dictated both by the individual and the primary culture in which he/she operates. Additionally, individuals might ascribe to subcultures that value other aspects of life such as athletic ability, higher spiritual or moral ground, or even criminal behaviour. Within these constraints, each person will draw upon a personal menu of attributes and achievements, dependent on exposure and experience, placing greater value on some elements than others. Some personal menus may closely conform to cultural norms and expectations, while others might be more individualised. However, the criteria on which self-esteem is based are ultimately set by the individual. Self-esteem is therefore essentially phenomenological and based on being an 'OK person' dependent on what the individual considers as 'OK'. This is an important principle as it suggests that the effect of exercise on self-esteem cannot be explained in the absence of consideration of the past experiences and values of the individual.

Measuring self-esteem and self-perceptions

A great deal of research was generated on self-esteem in the 1970s and 80s. Instruments consisted of banks of items, each calling for a response on perceived possession of some personal quality or competence such as having attractive facial features, academic ability, or lots of friends. These responses were simply totalled to produce a self-esteem score, a technique that has since been widely criticised as it does not take into account the multidimensionality of the self (Marsh, 1997; Wylie, 1979, 1989). More recently, a profile approach has been adopted where instruments are made up of several subscales each assessing self-ratings in different aspects of life or domains of competence such as work, family and friendships. Overall or global self-esteem or self-worth is best measured by a separate subscale using items which avoid specific domain content and refer to pride in self, general competence, and equal worth to others. Rosenberg's 10-item Global Self-Esteem Scale (Rosenberg, 1965) has been widely used and validated for adolescents onward. Harter's self-perception profiles for adolescents and adults include a General Self-Worth subscale of this nature (Harter, 1988; Messer & Harter, 1986), as does Marsh's Self-Description Questionnaire series (Marsh, 1992a, 1992b)

Following the use of self-perception profiles and separate global or self-esteem scales, models depicting how dimensions are related to self-esteem have been offered and in some cases tested. Some support has been provided for a hierarchical structure like the roots of a tree, with self-esteem forming the stable apex or tree trunk. Domains of life form the main roots, with increasingly finer roots that search out closer contact with life experiences and represent more specific content (see Figure 5.1).

Of particular significance to exercise and mental health is the physical self. This is consistently featured as a strong root in the self system with an overall physical self-worth underpinned by a range of physical attributes

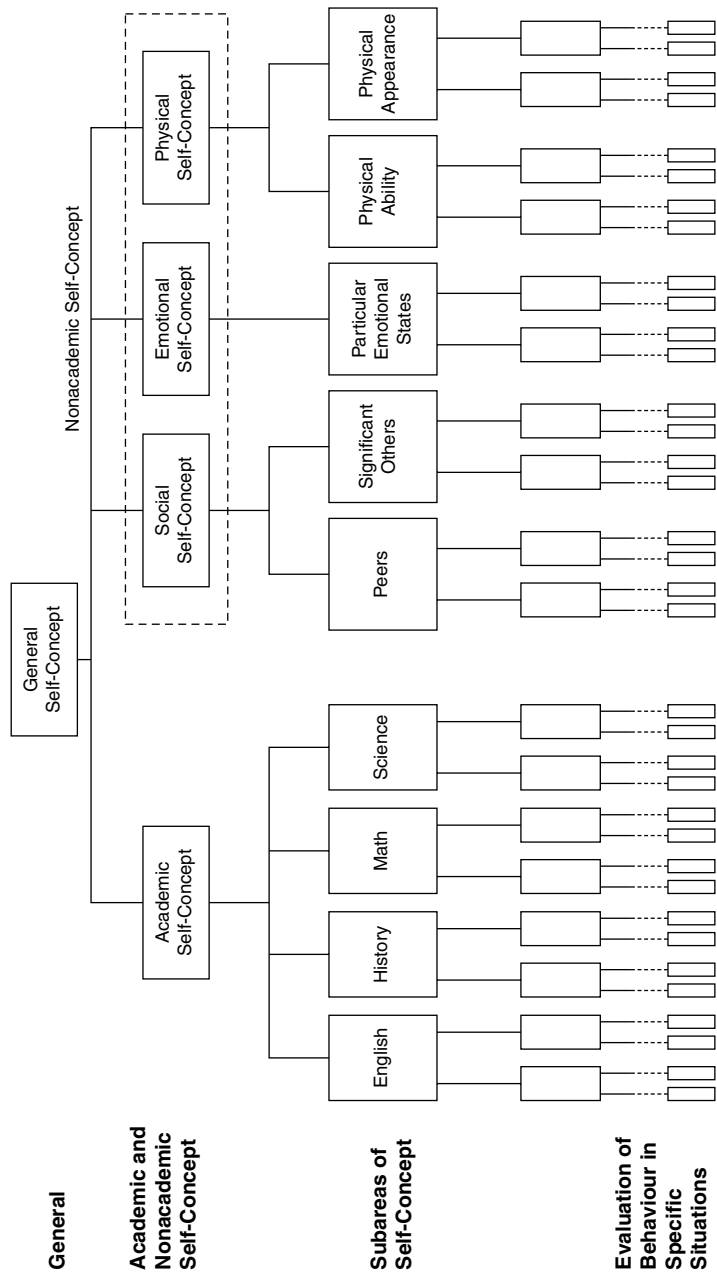


Figure 5.1 A hierarchical model of self-concept.

From R.J. Shavelson, J.J. Hubner, and G.C. Stanton. (1976). 'Self-concept: Validation of Construct Interpretations.' *Review of Educational Research*, 46, p.413. Copyright by the American Educational Research Association, reprinted by permission of the publisher.

and competencies. With the development and validation of hierarchical models, it has become possible to locate measures of self-perception according to the specificity of their content (see Figure 5.2).

The Tennessee Self-Concept Scale (TSCS) was one of the first instruments to utilise a multidimensional structure and the review featured later, in this chapter will identify it as the instrument of choice in many of the earlier exercise/self-esteem studies. It consists of a physical self subscale as well as subscales to assess moral/ethical, personal, family and social dimensions in addition to a lie scale. Unfortunately, the physical self subscale totals diverse items, many of which have little relevance to exercise. Marsh and Richards (1988) through confirmatory factor analysis, criticised the instrument for poor psychometric qualities. Results using the TSCS are likely to be less convincing than they might be, although the instrument has recently been upgraded and may be particularly useful for clinical settings with patients with psychiatric disorders (Byrne, 1996).

Two well-validated comprehensive instruments have been developed in recent years to assess self-ratings at two levels of the physical domain. The Physical Self-Perception Profile (Fox & Corbin, 1989) measures perceptions of sport competence, physical strength, physical condition, body attractiveness and overall self-worth. The Physical Self-Description Questionnaire measures nine elements of the physical self (Marsh, Richards, Johnson, Roche, & Tremayne, 1994), general physical self and general self-esteem. In addition to profiles, there are also instruments to measure singular aspects of the physical self. Aspects of body appearance have been assessed for many years such as body image, body satisfaction (with whole and parts), body acceptance, and more recently social physique anxiety (anxiety associated with displaying the body in public settings).

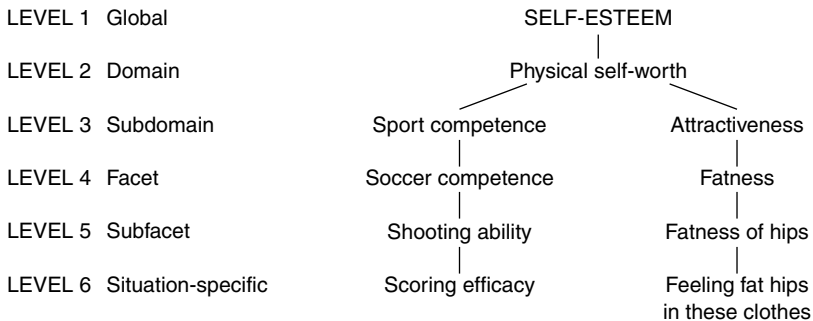


Figure 5.2 Self-perception constructs measurable at different levels of specificity. From K.R. Fox (1998). 'Advances in the Measurement of the Physical Self'. In J.L. Duda, *Advances in Sport and Exercise Psychology Measurement*. Morgantown, WV: Fitness Information Technology.

It is also possible to assess quite specific aspects of the physical self that have particular relevance to an intervention. *Self-efficacy* measures fall into this category and represent an individual's perceived confidence in their ability to successfully complete a task such as climbing stairs, visiting a swimming pool, maintaining a three-times-a-week exercise programme. Although these self-ratings do not represent self-esteem change, they may help identify possible mechanisms through which self-esteem might be enhanced. These measures are of particular significance to interventions with older people and those in rehabilitation where confidence in movement ability may initially be low.

What is clear is that an array of measures to assess self-perceptions and self-esteem is available to the health professional or researcher who wishes to document possible change due to participation in an exercise programme. It is not within the scope of this chapter to review all available instruments. The interested reader should see Byrne (1996) for the whole range of self-concept instruments. For the assessment of physical self-perceptions, see Fox (1998), for body image, see Bane and McAuley (1998) and for self-efficacy and exercise-related confidence, see McAuley and Mihalko (1998).

Unfortunately, it is only recently that the more theoretically grounded and comprehensive instrumentation has appeared in the exercise/self-esteem intervention literature so that much of the evidence is based on poorly validated assessments. Furthermore, there has not been a systematic approach adopted. The general view is that specific elements are more accessible to change, and Sonstroem and Morgan (1989) have presented a testable model indicating how experiences with exercise might improve self-efficacy and eventually affect physical self-worth and self-esteem (Figure 5.3). Models such as this could offer a consistent framework for furthering exercise and self-esteem research but to date published studies are not in evidence.

Recently, Sonstroem, Harlow and Josephs (1994) modified the original model of Sonstroem and Morgan (1989) in conjunction with the Physical Self-Perception Profile (Figure 5.4). The relationships in the model were supported through structural equation modelling. This provides an example of how improved instrumentation in combination can offer a more comprehensive and systematic framework for the study of self-perception change through exercise.

The potential for exercise in the promotion of self-esteem

However, the focus of interventions has been the simple description of change and little research has been conducted on the identification of mechanisms of change. There are many potential candidates. High value is attached in the dominant western culture to physical attractiveness (particularly for women), and a range of competencies and status indicators such as educational attainment, success at work, physical and artistic

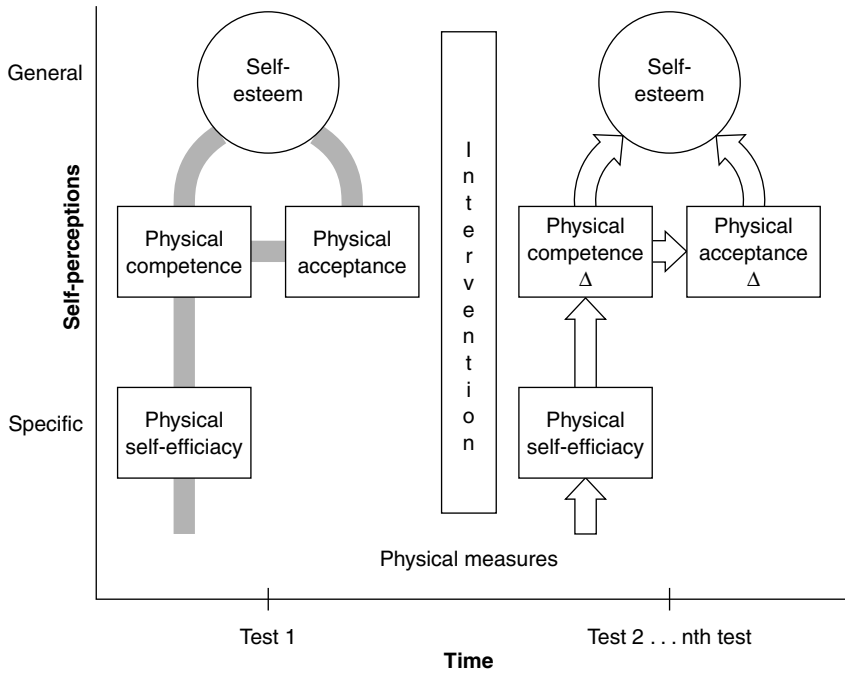


Figure 5.3 The Exercise and Self-Esteem Model for intervention studies. W.P. Morgan, and R.J. Sonstroem (1989). 'Exercise and self-esteem: Rationale and model.' *Medicine and Science in Sports and Exercise*, 21, 329–337.

skills, sporting ability, and to some extent wealth and material possessions. With improved competence comes a sense of *effectiveness*, feelings of *self-determination* and *personal control*. These are tied to self-esteem. Furthermore, *self-acceptance* – the degree to which we accept our strengths and weaknesses, may also influence self-esteem, based on the assumption that we cannot all excel at everything. These are important considerations in the design of interventions to promote self-esteem. It is possible, for example, that self-esteem can be lowered through experiences in the physical domain if the conditions raise awareness and self-criticism without increasing perceived competence. In addition, several theorists argue that humans have a need to sense social significance as reflected by feelings of power, importance, relatedness, belonging, love worthiness, and unconditional worth. This social need may offer a further route to self-esteem enhancement.

The physical domain features strongly in the value system of the western culture and as a result is consistently included in models of self-esteem. Elements of physical self are particularly significant as the body functions as the *public interface* of the self with the social world and is used to project characteristics such as status, sexuality, youthfulness,

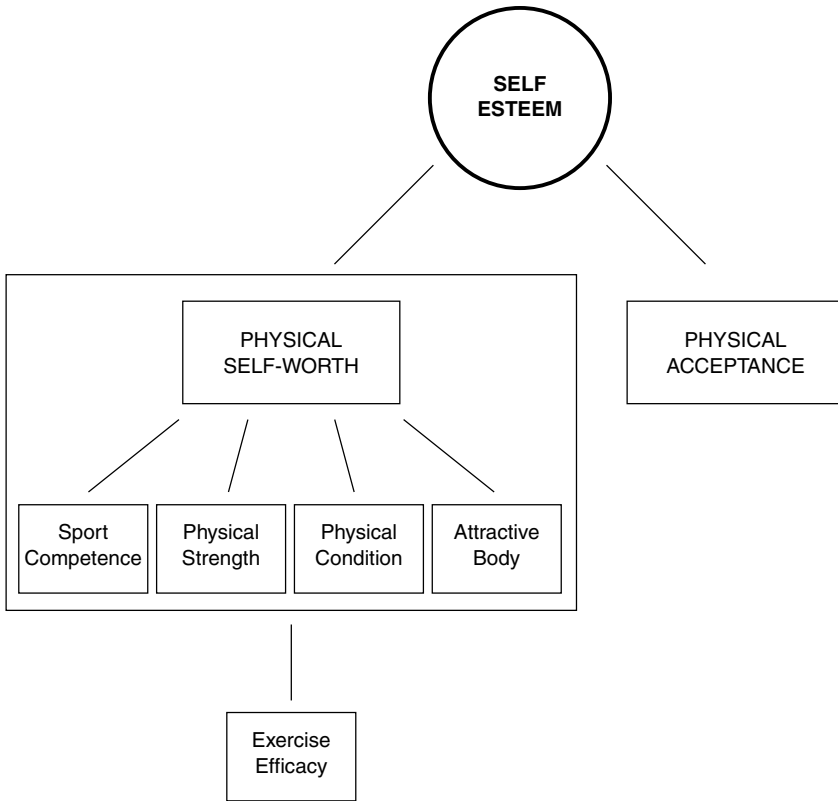


Figure 5.4 Adaptation of the Exercise and Self-Esteem Model for use with the Physical Self-Perception Profile (after Sonstroem, Harlow, & Josephs, 1994).

From K. R.Fox (1998). 'Advances in the Measurement of the Physical Self.' In J.L. Duda, *Advances in Sport and Exercise Psychology Measurement*. Morgantown, WV: Fitness Information Technology.

and prowess. For this reason, the physical self may be particularly important in the development of self-esteem. Cross-sectional research has indicated that body image provides the strongest correlation with self-esteem ($r = 0.6-0.8$) throughout the lifespan. Physical skills, fitness, and sport competencies are also important to many, especially youngsters as they grow and learn to make comparisons, but the strengths of these correlations vary among populations. The potential mechanisms by which involvement in exercise or sport might promote self-esteem therefore are broadly:

- An undetermined psychophysiological mechanism that enhances mood and positive self-regard.

- Enhanced body image, body satisfaction or body acceptance through weight loss or improved muscle tone.
- Enhanced perceived physical competence through improved abilities, prowess, and aspects of fitness such as strength and cardiorespiratory function.
- Enhanced sense of autonomy and personal control over the body, its appearance, and functioning.
- Improved sense of belonging and significance through relationships with exercise leaders or others in the exercise group.

For further discussion of potential mechanisms some of which have yet to be adequately researched, see Fox (1997) and Sonstroem (1997a, 1997b).

It is in the context of these recent developments in theory and instrumentation that the literature investigating the influence of exercise on self-esteem should be examined. This is particularly the case for the physical self which has emerged as a strong correlate of global self-esteem and a likely location for the operation of the main mechanisms of its change.

Evidence of the effect of exercise on self-esteem

Against this background, the second section of this paper will provide an update and overview of existing research that is relevant to the effect of exercise on self-esteem and self-perceptions. The following sources were used:

- electronic data bases including Medline, Psychinfo, PsychLit, Sport Discus, with follow up using BIDS;
- previous reviews with at a least a section on self-esteem/self-concept including Berger and McInman (1993), Calfas and Taylor (1994), Doan and Scherman (1987), Gleser and Mendelberg (1990), Leith (1994), Leith and Taylor (1990), Sonstroem, (1984), Sonstroem (1997a, 1997b), and Spence (unpublished);
- personal records of papers and abstracts.

Cross-sectional research

The early descriptive literature related to self-esteem, physical activity, exercise and sport is vast, with much of it lacking theoretical grounding and generated with poor instrumentation. Studies generally fall into three categories:

- those comparing groups who take part in specific sports or exercise activities with similar groups who are not involved;
- those comparing groups who are fit or low in body fat with those who are unfit or overweight; and

- those involving larger population samples where level of leisure activity has been related through correlation analyses to aspects of well-being including self-esteem.

In many studies, measures were composite self-esteem scales or assessments of body cathexis or body image. More recent research has used perception profiles that have provided a richer documentation of relationships. The following general conclusions can be drawn from this literature:

- Taking part in regular sport or exercise is moderately associated with more positive physical self-perceptions, including body image, from late adolescence onwards (e.g. Fox & Corbin, 1989; Sonstroem, Speliotis, & Fava, 1992).
- Being fit and slim are weakly associated with positive physical self-perceptions, body image and in some populations body satisfaction (e.g. Balogun, 1987; Fox, Page, Armstrong, & Kirby, 1994; Tucker, 1987).
- Sport and exercise participation are weakly associated with global self-esteem in many studies but this relationship is inconsistent and is probably dependent on population, environmental, and individual characteristics.

There are several anomalies to these patterns, particularly among females who exercise heavily (Davis, 1997; Sonstroem, 1997a, 1997b), and athletes involved in activities where maintenance of low weight or a slim body is required for elite performance. Here, the benefits of activity appear not quite so apparent. Participation of this kind may heighten awareness, body centrality, and self-criticism. Also, some females seem susceptible to a 'shifting goal posts' phenomenon whereby their body satisfaction, body acceptance and self-esteem does not improve when they exercise, even though they acknowledge some success with weight loss or improved fitness. This demonstrates that confounding and mediating factors are often present to weaken self-esteem-exercise associations.

For the vast majority of the public who are the likely targets of exercise-based interventions in health care, the positive relationships seem to hold firm, particularly with increasing age. Those who are involved in sport or exercise generally have a higher level of physical self-perceptions, including physical self-worth and body image and there is a tendency for them also to have higher self-esteem than their age-group peers.

However, cross-sectional research tells us little about causality. Although participation in sport and exercise is associated with a higher degree of well-being, it is impossible to determine the degree to which positive self-perceptions are the *determinants* or *outcomes* of sport and physical activity participation. There is likely to be a high degree of simultaneous processing as self-perception benefits are experienced and this increases motivation to participate. It is also likely that associations are strengthened by previous

drop-out from sport and exercise of those who have experienced failure, embarrassment and whose physical self-perceptions and self-esteem have been under threat. Also those suffering mental disorders such as depression are more likely to avoid structured physical activity.

Intervention research

In comparison to other aspects of exercise and mental well-being, surprisingly few reviews of exercise and self-esteem research have been published. Sonstroem conducted a narrative review in 1984 and reported the findings of 16 intervention studies. He concluded 'Exercise programs are associated with significant increases in self-esteem scores of participants' (p. 138). However, only ten studies had control groups, only four were randomised, and half the studies had 20 or fewer subjects in the experimental treatment. Nine studies employed physical self as well as self-esteem measures. Sonstroem went on to state, 'At this time it is not known why or in what manner exercise programs affect self-esteem, or which people are responsive' (p. 150).

Although several reviews have included sections on self-concept, and Gruber (1985) conducted a meta-analysis of studies with children, the only other comprehensive review has been Leith (1994). He reported 16 experimental, 21 quasi-experimental, and 10 pre-experimental studies and concluded 'Approximately one-half of the studies reviewed reported significant changes in self-concept/self-esteem following participation in an exercise programme. These results appear quite inconsistent'. However, he also went on to make several interesting summary statements and observations, several of which are taken on board in the remaining section of this paper.

In the context of evidence-based health initiatives, this paper prioritises randomised controlled studies (RCSs) and these are summarised in Table 5.1. RCSs are particularly important given the special difficulties encountered in self-esteem research which include effects from socially desirable responding, expectancy, self-presentation strategies, pleasing the leader/researcher, and temporary versus lasting effects. In addition, a further 44 non-randomised controlled studies were considered.

General conclusions

Table 5.1 shows that only 36 RCSs were identified in the literature since 1970, and these included nine unpublished masters and doctoral dissertations. This represents little more than a study per year and contrasts vividly with the many hundreds of studies in some areas of health services research. These investigations involved a wide range of populations, exercise modes and instrumentation, making comparisons and generalisations difficult and in some instances meaningless.

Of the 36 studies, 28 (78%) indicated positive changes in some aspects of physical self-esteem or self-concept. This is a robust and significant finding that gives clear evidence that exercise helps people see themselves more positively. The results appear stronger for aspects of the physical self (particularly aspects of body image). This is important as they are consistently related to global self-esteem throughout the lifespan. Furthermore, an important recent study has indicated that *physical self-worth* (from the PSPP) which is the global summary of all perceptions in the physical domain carries important emotional adjustment qualities. This has been established independently of self-esteem and socially desirable responding on questionnaires (Sonstroem & Potts, 1996). This suggests that physical self-worth and related constructs should be regarded as key mental health indicators in their own right and should be assessed systematically in interventions. As physical self-perception profiles featuring global physical self-worth subscales have only appeared in the last 10 years, a critical construct has not been assessed in most of the studies.

Where *global self-esteem* was assessed, there were mixed findings with about half the studies showing generalised improvement. This is similar to the conclusions of Leith (1994) and also Berger and McInman (1993) who found that 44% of reviewed studies indicated positive change. It is also supported by conclusions from a recent meta-analysis by Spence and Poon (1997) that has yet to be published as a full paper. They conclude that a small (0.22) but significant effect size emerges for the effect of exercise on self-concept or self-esteem. The inconsistency or weakness in findings across studies may be partly due to differences in instrumentation. Where the Rosenberg scale was used, which is one of the better validated scales, significant change beyond controls was rarely reported. Significant improvements were more likely to be recorded with TSCS (which does not contain a true global self-esteem scale) or the summed-item composite self-concept measures which have been highly criticised.

Certainly the evidence suggests that increases in self-esteem (a) do not automatically arise through exercise involvement, and (b) may not always accompany positive changes in physical self-perceptions. However, this is entirely in line with theoretical projections which suggest that the self-esteem construct is the stable outcome from a wide array of life events. Exercise would have to be a particularly powerful experience to instigate a group change in a matter of a few weeks (especially if sense of mastery is the key mechanism), although it may occur with particularly receptive individuals.

Another explanation for the discrepant findings with self-esteem is the likely interaction between the nature of the population studied and the type and setting of exercise. What works for some may not be effective for others and mediating or confounding factors have rarely been assessed in studies.

Table 5.1 Randomised control trials addressing the effect of exercise on self-esteem and physical self-perceptions

<i>Author(s)</i>	<i>Date</i>	<i>Subjects</i>	<i>Groups</i>	<i>Treatment</i>	<i>Instruments</i>	<i>Results</i>
(i) Children						
McGowan et al.	1974	37 grade 7 boys with low self-esteem	1. endurance training and team sport (with winning enhanced) 2. Control	18 weeks 3-4 × per week	TSCS	Greater increase in exercise group
Neal ^a	1977	60 grade 9 boys (15 per group)	1. CV fitness 2. Counselling (goals) 3. CV fitness + counselling 4. Control	10 weeks Exercise program not outlined	CSEI	No change
Martinek et al.	1978	344 boys and girls from grades 1-5	1. Motor activities and gymnastics 2. Control	45 minutes 1 × per week	MZ	Increase in the treatment group
Percy et al.	1981	30 grades 5 and 6 girls and boys	1. Running 2. Control	7 weeks 3 × per week	CSEI	Marked increase in treatment group
Schempp et al.	1983	208 boys and girls from grades 1-5	1. Shared decision 2. Teacher dominated 3. Control	Movement ed./gym 8 weeks 1 × 45 mins per week	MZ	Greater increases in both treatment groups. Effect size 0.59
Smith ^a	1984	49 boys and girls grades 4 and 5	1. Running 2. Yoga 3. Control (PE class)	10 weeks 3 × per week	PHSCS	No significant change

Marsh & Peart	1988	137	grade 8 girls	<ol style="list-style-type: none"> 1. Competitive exercise 2. Cooperative exercise 3. Volleyball control 	6 weeks 14 sessions of 35 mins aerobic exercise	SDO II	Increases in physical self in cooperative group and decline in competitive group. No change in global self.
Calfas & Cooper (Abs.)	1996	44	adolescent girls	<ol style="list-style-type: none"> 1. CV exercise + computer classes 2. Computer classes 	5 weeks at summer school 10 hours CV exercise/week	SPPA	Athletic competence increased in Group 1 and self-esteem in both groups
(ii) Adults							
Johnston ^a	1970	73	male college students of low-average fitness	<ol style="list-style-type: none"> 1. Physical condition 2. Sport skills 3. Control 	Not stated	Q-Sort technique	No change in self-concept or movement concept
Davis ^a	1971	39	male college students	<ol style="list-style-type: none"> 1. CV exercise I 2. CV exercise II 3. Control 	Not stated	TSCS	No change
White ^a	1974	152	college students enrolled in PE classes	<ol style="list-style-type: none"> 1. Individualised circuit training 2. Normal PE classes 	10 weeks (frequency and time not stated)	TSCS	Increased self-esteem and subscales beyond controls

Table 5.1 (continued)

<i>Author(s)</i>	<i>Date</i>	<i>Subjects</i>	<i>Groups</i>	<i>Treatment</i>	<i>Instruments</i>	<i>Results</i>
Hilyer & Mitchell	1979	120 college students	1. Running & stretching 2. Same + counselling 3. Controls	10 weeks 3 × per week	TSCS	Increased self-concept in Group 2
Trujillo	1983	35 female college students	1. Weight training 2. Running 3. Active controls	16 weeks typical college activity classes?	TSCS	Groups 1 & 2 increased self-concept. Group 1 improved significantly greater than active control
Brown & Harrison	1986	85 mature and young women	1. Weight training 2. Inactive control	12 weeks 3 × per week for 60 minutes	TSCS	Increases in physical self-concept and self-satisfaction for both young and mature groups
Ben Shlomo & Short	1986	sedentary females	1. Arm training 2. Leg training 3. Control	6 weeks 3 × per week of leg or arm ergometry at 60–80% max HR	TSCS BCS	No change in self-concept, physical self-concept or body cathexis
O'Neill ^a	1989	53 non-athlete female college students	1. Aerobic exercise sessions 2. Aerobics lectures	4 weeks (frequency & time not stated)	TSCS	Physical self-concept increased in Group 1.

Cocklin ^a	1989	69 women aged 20–50	<ol style="list-style-type: none"> 1. Exercise (mod. int.) 2. Exercise (light int.) 3. Inactive controls 	<ol style="list-style-type: none"> 1. To improve CV fitness 2. As placebo 	<p>8 weeks × 3 per week</p> <p>IAV BCS</p>	<p>Self-acceptance increase in both exercise groups but body cathexis unrelated</p>
Cusumano & Robinson	1992	95 female college students	<ol style="list-style-type: none"> 1. Hatha yoga 2. Progressive relaxation 	3 weeks 3×80 mins session	RSES PSES	<p>PSES decreased while self-esteem increased in both groups. No group differences</p>
Desharnais et al.	1993	male and female adults	Running		RSES	Positive changes
Brown et al.	1995	135 middle-aged sedentary men and women	<ol style="list-style-type: none"> 1. Mod. int. walking 2. Low int. walking 3. low int walking + relaxation response 4. Group t'ai chi 5. Control 	<p>16 weeks 3 × per week (must have completed at least 42 sessions). All sessions at indoor facility</p>	<p>RSES SPES BCS Success expectancies</p>	<p>Positive changes in exercise groups for body cathexis and physical competence, time effect for self-esteem but not group differences</p>

Table 5.1 (continued)

<i>Author(s)</i>	<i>Date</i>	<i>Subjects</i>	<i>Groups</i>	<i>Treatment</i>	<i>Instruments</i>	<i>Results</i>
King et al.	1989	120 middle-aged mainly sedentary men and women	<ol style="list-style-type: none"> 1. Home-based exercise 2. Inactive controls 	6 months of walk/jog at 65–77% max HR. 5 sessions per week prescribed	Perceptions of satisfaction with appearance, fitness, weight and ratings of health behaviours	Increase in satisfaction levels and health ratings in exercise group
King et al.	1993	357 50–65 year-old sedentary men and women	<ol style="list-style-type: none"> 1. High int. ex. group 2. High int. home ex. 3. Low int. home ex. 4. Inactive controls 	12 months programme High int. – 3 × 40 mins per week at 73–83% max. Low int. – 5 × 30 mins	Self-perception of change in health, appearance, fitness, and weight	Higher rating of change in all 3 exercise groups than controls
Tucker & Mortell	1993	60 early middle-aged women	<ol style="list-style-type: none"> 1. Walking 2. Weight training 	12 weeks 3 × per week home-based weights or walking	BCS ratings of fitness and fitness improvement	Improvements in both groups but greater in weight weight training
Alferman & Stoll	1995	Sedentary middle-aged adults	<ol style="list-style-type: none"> 1. Exercise 2. Waiting list control 	6 months 1–2 sessions per week for 60 mins	Not stated	Increase in physical concept but not self-esteem

Alfmerman & Stoll	1995	Sedentary middle-aged adults	<ol style="list-style-type: none"> 1. Fitness 2. Jogging 3. Relaxation 4. Back exercises 	6 months 1-2 sessions per week for 60 mins	Not stated	All groups increase in physical self-concept and self-esteem but exercise groups significantly greater improvement in physical self-concept	
Palmer	1995	27, nonclinical, premenopausal women	<ol style="list-style-type: none"> 1. Supervised walking 2. Non-walking control 	8 weeks building from 20 mins per session. Frequency not stated	RSES	Increase in self-esteem in walking group only	
Talbot & Taylor (Abs.)	1998	142 middle-aged patients with risk of CHD	<ol style="list-style-type: none"> 1. Exercise prescription scheme 2. Non-referred controls 	CV exercise + weights (shortened) 10 weeks 2 × per week	PSPP PIP	Increase in physical self-worth, condition, appearance, and health	
(iii) Special populations							
Collingswood	1972	50 male adult rehabilitation patients	<ol style="list-style-type: none"> 1. Physical training 2. Control 	4 weeks, 5 × per week for 60 mins of general fitness work	Body attitude scales IAV	Improvements in body attitude, self-concept and self-acceptance	
Whiting ^a	1981	80 alcoholics	<ol style="list-style-type: none"> 1. Therapy 2. Therapy + exercise 	Exercise 5 days per week incl. 2 miles walk, gym activity and swim	TSCS	Increases in both groups but no additional effect due to exercise	

Table 5.1 (continued)

<i>Author(s)</i>	<i>Date</i>	<i>Subjects</i>	<i>Groups</i>	<i>Treatment</i>	<i>Instruments</i>	<i>Results</i>
Hilyer et al.	1982	60 males, 15–18 years, 55% black youth offenders	<ol style="list-style-type: none"> 1. Fitness group + counsellor support 2. Team sports 	Strength, CV exercise and flexibility 20 weeks 3 × 90 mins	Self-esteem Inv Form A	Increase (but impact of counselling not known)
Hannaford ^a	1984	25 depressed males	<ol style="list-style-type: none"> 1. Exercise 2. Corrective therapy 3. Waiting list controls 	Jogging 3 days per week × 30 mins (length not stated)	RSES	No increase in self-esteem even with increase in CV fitness and reduced depression
Short et al.	1984	45 overweight/obese policemen 29–52 years old	<ol style="list-style-type: none"> 1. Instruction + conditioning 2. Instruction alone 	8 weeks of 90 mins lifestyle instruction and 3 × 45 mins walk/jog.	TSCS	Greater increases (2–3 times) in exercise group in physical self, personal self and self-satisfaction
MacMahon & Gross	1988	54 learning disabled boys	<ol style="list-style-type: none"> 1. High int. exercise and sports 2. Low int. exercise and sports 	20 weeks <ol style="list-style-type: none"> 1. HR >160. 2. Intermittent with HR < 160 	PH with assistance	Increase in both groups with high intensity greatest.

Ossip-Klein et al.	1989	32 depressed female adults	1. Running 2. Weights 3. Delayed control	8 weeks 3-4 × per week 20 mins running or weights + warmup & cool down	Beck Self-Concept Test Osgood's Semantic Differential	Increase in self- concept, perceptions of energy and fitness in both exercise groups
Mactavish & Searle	1992	26 middle-aged males and females with mental retardation	1. Physical activity 2. No activity	5 weeks of subject selected activity and sports	Perceived Leisure Competence Scale RSES	Greater increases in perceived competence and self-esteem in treatment group
Donaghy & Mutrie	1998	117 men and women in alcohol rehabilitation	1. Group and home exercise 2. Control	3 weeks formal exercise followed by 12 weeks home-based activity	PSPP	Change in physical self- worth, perceived condition and strength at 4 weeks month and condition and strength at 8 weeks in exercise group. NS at 5 months

Notes:

^a = PhD Abstract only.

BCS (Body Cathexis Scale: Secord & Jourard, 1953) CSEI (Coopersmith Self-Esteem Inventory: Coopersmith, 1967) IAV (Index of Adjustment and Values: Bills, Vance, & McLean, 1951) MZ (Martinek-Zaichowsky Self-Concept Scale for Children: Martinek & Zaichowsky, 1977) PHSCS (Piers-Harris Self-Concept Scale for Children: Piers, 1984) PSES (Physical Self-Efficacy Scale: Ryckman, Robbins, Thornton & Cantrell, 1982) PSPP (Physical Self-Perception Profile: Fox, 1990; Fox & Corbin, 1989) PIP (Perceived Importance Profile: Fox, 1990) PSDQ (Physical Self-Description Questionnaire: Marsh et al, 1994) RSES (Rosenberg Self-Esteem Scale: Rosenberg, 1965) SDQ II (Self-Description Questionnaire for Adolescents: Marsh, 1992a) SPES (Sonstroem's Physical Estimation Scale: Sonstroem, 1978) SPPA (Self-Perception Profile for Adolescents: Harter, 1988) TSCS (Tennessee Self-Concept Scale: Fitts, 1965)

Which populations can benefit?

Children and adolescents

Gruber (1986) conducted a meta analysis of studies with children and in 1994, Calfas and Taylor reviewed the impact of physical activity on the psychological well-being of adolescents, and included a section on self-concept. Gruber concluded that the effect of activity programmes was positive, particularly for those already low in self-esteem. Physical fitness and aerobics programmes produced superior results to motor skill and sport programmes. There is also some evidence (Marsh & Peart, 1988; Schempp, Cheffers, & Zaichowsky, 1983) that cooperative and more democratic exercise settings produce stronger effects and this is supported by recent literature on motivational climate in sport, exercise and physical education. Calfas and Taylor (1994) when comparing the effects on the range of mental benefits found that the strongest changes were for self-esteem, self-concept or self-efficacy with nine out of ten studies revealing positive results. Of the eight RCSs conducted with children in Table 5.1 (which include two reported by Calfas & Taylor) five report self-concept or self-esteem changes and a sixth found changes in physical self-concept accompanying exercise. One trial (Hilyer et al., 1982) reported self-esteem improvements with youth offenders when exercise was combined with counsellor support. Although exercise/self-esteem studies have been conducted with obese children, it is not possible to single out the effects of exercise from weight loss (French, Story, & Perry, 1995)

The evidence is sufficient to conclude that exercise is an effective medium for developing a positive self in children, is particularly effective for those with low self-esteem, and has greatest potential when presented in a style that will encourage mastery and self-development. It must also be kept in mind that school-based programmes have potential to lower self-esteem, as youngsters are not in the same position as adults to drop out if experiences are negative.

Young adults

Seven RCTs were located with young adults who were mainly US college males and females. Six of the studies used the Tennessee Self-Concept Scale. Six showed positive change with one restricted to change in the physical self and another in the group where exercise was combined with exercise counselling (Hilyer & Mitchell, 1979). A range of exercise modes was used with the majority being aerobics or running, circuit training, and weight training. A further 20 controlled studies with intact groups were identified, 13 being unpublished theses or dissertations. Fifteen of these studies involved students across a range of college activity classes, with the majority focusing on aerobic dance, cardiovascular fitness and

weight training. Most studies used the TSCS and the Body Cathexis Scale. Half the studies reported non-significant results and some of the remaining studies showed only weak gains.

This literature is biased towards US college students, the majority already having average to high self-esteem and being involved in regular physical activity. It is unlikely therefore that young adults as a group will experience the greatest mental benefits from exercise. They are also a low health risk population and therefore unlikely to receive priority attention for mental health service provision.

Middle-aged adults

Middle-age appears a particularly crucial time for exercise interventions as the population becomes less active, increases in weight and symptoms of ageing become more apparent and yet there seems to remain some potential for lifestyle change. This is a population therefore that is of particular interest to health service providers. Seven of the best designed and most recent RCSs were with large groups of previously sedentary populations in this age range (Alferman & Stoll, 1995 [two studies]; Brown et al., 1995; King, Taylor, & Haskell, 1993; King, Taylor, Haskell, & DeBusk, 1989; Talbot & Taylor, 1998; Tucker & Mortell, 1993). Studies ranged in length from 10 weeks to a year with four studies lasting at least 6 months. Programmes included moderate versus low intensity walking, home-based versus group exercise, walking versus weight training, and fitness and jogging versus relaxation. All studies indicated positive improvement in physical self-perceptions. These included ratings of fitness, appearance, physical health, body cathexis, and physical self-worth. However, only three studies assessed global self-esteem and this did not indicate significant improvement. Even in the absence of global self-esteem change, this produces a robust picture of psychological improvement in these groups and warrants further consideration for health service investment. These studies are also backed up by a growing literature on self-efficacy and physique anxiety in middle-aged individuals which reveals potential exercise benefits (McAuley, Courneya, & Lettunich, 1991; McAuley, Mihalko, & Bane, 1995). It is well established that this population can benefit a great deal in reduced incidence of morbidity and mortality through heart disease, obesity, diabetes and some cancers. Improvements in mental well-being may increase motivation so that the full array of benefits is experienced.

Older adults

No RCSs were located for elderly adults. This is surprising given the potential of exercise to increase functionality, independence, and life quality. Studies have tended to address other constructs such as life satisfaction,

subjective well-being and quality of life. Four unpublished controlled studies involving exercising groups were identified. Flexibility programmes were ineffective (Bozoian & McAuley, 1994; Yeagle, 1982) but strength and fitness programmes indicated positive self-concept changes (Bozoian & McAuley, 1994; Olfman, 1987). Recently, Mutrie and Davison (1994) recruited 83 adults with a mean age of 61 years who self-selected into either a home-based or class-based exercise programme lasting 3 months. Measures using the PSPP were applied pre- and post-programme and 6 months after the programme. Positive changes in physical self worth were found for both groups and these were greatest for the class-based exercisers. Further trials with this population are required that combine self-efficacy, physical self-perception and self-esteem measures.

Special populations

Several groups fall into this category including those with mental disorders, those who are in rehabilitation from substance abuse, ill-health or injury, those who have physical disability, and those who are obese. In reviewing the effect of exercise on self-esteem of special groups, Leith (1994) pointed out that only 3 of 13 studies did not produce significant change. This was attributed in part to these groups initially being low in self-esteem. However, there are few well-designed studies with special groups, possibly because of recruitment and randomisation difficulties. There are RCSs to support change due to exercise in adults with mental retardation (Mactavish & Searle, 1992), depressed females (Ossip-Klein et al., 1989), youth offenders (Hilyer et al., 1982), obese males (Short, DiCarlo, Steffee, & Pavlou, 1984), male rehabilitation patients (Collingwood, 1972) and problem drinkers (Donaghy & Mutrie, 1998). There is a body of literature on disability and sport participation indicating that there is great potential for involvement to improve mental well-being in people with disabilities (Sherrill, 1997). However, as yet there are no well-controlled studies with this population. Clearly, the potential benefits for a range of special populations is high and much further research is required.

Gender differences

There is evidence that exercise has a beneficial effect for males and females. There may be greatest potential for females as they consistently score lower initially on self-confidence in physical activity and also body image, physical self-worth and self-esteem (Lirgg, 1991).

What are the characteristics of effective exercise?

Type of activity

The effect of a wide range of physical activities and sports has been investigated. Various forms of cardiovascular exercise including running, walking, aerobic dance, and circuit training are most common in studies. All of these activities have indicated that they can be effective in improving self-perceptions, although there is a reflection of the general finding that only approximately 50% produce significant change. Studies with other activities such as swimming, flexibility training, martial arts, and expressive dance have generally failed to indicate significant change, however they are too few in number to make firm conclusions. Many of these studies have been conducted on college-age males and females, a population prone to non-significant results. Where endurance exercise and walking has been used with middle-aged adults, there is more conclusive evidence of success than with younger adults.

Weight training has attracted increasing attention and ten studies including two RCSs have recorded improvements in body image and other physical self-perceptions in men and both young and middle-aged women. Some RCSs have made comparisons between resistance exercise and other activities including running (Trujillo, 1983), walking (Tucker & Mortell, 1993) and also swimming, aerobics, and PE classes. There is some indication that resistance training is superior to endurance exercise in improving body image and physical self-esteem.

Exercise frequency, intensity and duration

There is insufficient variance in the studies to assess the impact of frequency of exercise with the vast majority of programmes opting for three sessions per week. This is in contrast to current recommendations for health-related activity which is five or six occasions of moderate intensity activity per week. Intensity is rarely reported and only two RCSs compared low with high intensity exercise. King et al. (1993) found that both treatments were effective in stimulating psychological improvement in adults with no differences in degree of change. MacMahon and Gross (1988) found that higher intensity sports were more successful with learning disabled boys. Most studies report the length of the exercise session and programmes that last longer than 60 minutes are more likely to produce positive change. This may reflect an increasing level of commitment in the participants.

Programme duration

Programmes have varied in length from a single session to 12 months. Leith (1994) recently divided studies into those lasting 8 weeks or less, 9 to 12

weeks, and more than 12 weeks. He concluded that although there was evidence of change in some studies in all of these groups, there was a higher likelihood of self-esteem change in longer programmes. The RCSs reported here support this observation. However, the longer well-controlled studies have not assessed global self-esteem and the time required for lasting change; also, how long change lasts is still not known.

What are the mechanisms?

Although there is sound evidence that exercise can produce positive changes in well-being through improved physical self-perceptions and sometimes self-esteem, the question still remains as to the main mechanisms underpinning such change. For the fine tuning of intervention design, it is important not only for mechanisms to be determined but also for the conditions under which they optimally function to be identified.

Returning to possible mechanisms outlined earlier in this paper:

- 1 *An undetermined psychophysiological mechanism.* The cross sectional and longitudinal evidence fail to show a *consistent* relationship between global self-esteem and exercise participation. This suggests the absence of a generic or generalised psychophysiological or psychobiochemical effect. The variance among studies both for populations and characteristics of the exercise setting suggests that mechanisms are more likely to be psychosocial in origin.
- 2 *Improvements in fitness or weight loss.* There is evidence from several studies that fitness change (as measured by standard laboratory or field tests of fitness) is not necessary for enhanced self-esteem or improved physical self-perceptions (Ben-Shlomo & Short, 1986; King et al. 1989; Ossip-Klein et al., 1989; Palmer, 1995). This parallels the obesity treatment literature where amount of weight lost is not consistently reflected in the psychological benefits (French, Story & Perry, 1995). Perceptions of health, physical competence, fitness and body image may arise simply because there is a *feeling* that the body is improving through exercise. There is some indication that muscular fitness reflected in improved tone or strength can have a more rapid and powerful sensory effect than cardiovascular or flexibility change.
- 3 *Autonomy and personal control.* There is no direct evidence to establish sense of control over the body, its appearance and functioning as the main route to self-esteem change. Instrumentation has not been systematically used to test this hypothesis. Furthermore, because autonomy is tied to identity change, it is unlikely that many studies have been conducted for long enough for any effect to be adequately documented. However, the cross-sectional evidence that changes in self-efficacy for exercise is associated with adherence in middle-aged

and older people (see McAuley et al., 1995) suggests a promising line for intervention research.

- 4 *Sense of belonging and significance.* Group or individual social support can produce mental benefits and this may be possible in the exercise setting. However, the effect of exercising regularly in a group or regular contact with an exercise counsellor on social well-being has not been adequately tested. Two studies have included some form of counselling with the exercise programme and reported positive effects. To date, there is insufficient evidence to show that group exercise produces greater improvements in self-esteem or self-perceptions than home-based or individual exercise. It is likely to vary with the individual, and the population, and there may be gender differences in preference. Leisure-centre based exercise prescription schemes, for example, attract mainly middle-aged females who report social benefits (Fox, Biddle, Edmunds, Bowler, & Killoran, 1997). Exercise groups for the older middle-aged and elderly held in community and leisure centre settings seem to rely on social interaction as a key component to successful attendance patterns.

In summary, we still do not know what it is about exercise that helps people feel better about themselves. It is likely that there are several mechanisms operating, some tied to improvements in the body, others linked to social significance and the exercise setting. Firmer conclusions cannot be drawn at this time. The greater use of multidimensional self-perception instruments that are capable of more comprehensive documentation of the nature of change may be more revealing in future studies.

Cross-sectional research has already indicated that there may be several *mediating* variables involved in exercise/self-esteem links. These probably include factors such as the degree of autonomy experienced by the exerciser, the centrality or importance of exercise to the individual, and the nature of the exercise leadership. It is conceivable that some factors are *necessary* conditions under which self-esteem enhancement can take place. There are also factors attached to the exercise setting that may work against self-esteem development and this is particularly crucial for captive audiences such as schoolchildren.

Possibly more than any other element of well-being, self-esteem, because of its essentially subjective nature, is likely to be more consistently explained with a 'horses for courses' explanation. It is unlikely that a group mean approach will be sufficiently sensitive to individual differences in response to the many different characteristics of the exercise environment and motivational climate in which it is conducted.

It must also be realised that almost all studies report results of those who remain in the programme. Those who choose to drop-out may form an interesting group to study as they may reveal elements of the programme that are potentially negative in their effect such as increasing social physique anxiety or initiating feelings of incompetence and failure.

Implications for research

- Given the importance of the self to human functioning and health outlined at the beginning of this document, there has been a pitiful amount of well-designed research conducted, particularly in the form of true experiments (one trial per year). The reasons for this are not clear but this has been an underfunded area that has been seen to have little more than academic appeal and consequently has been ascribed low priority for health services funding.
- Research has largely been conducted by physical educators and sport and exercise scientists whose interests and needs are often quite different from those of health services professionals. This is reflected in an absence of evidence-based health principles underpinning research. For example, intention to treat statistics are not included in any of the studies reported in this paper and there is little evidence that cost-effectiveness has been considered.
- Randomised controlled trials are important but will not tell us all we need to know. Individual responses to the conditions of exercise and exercise settings will vary and it will be necessary to use time series case studies and a range of qualitative techniques to adequately unravel the mechanisms at work.
- Generally, studies have been too short to fully test out the influence of exercise on self-esteem. It is likely that a construct so critical to mental functioning as self-esteem will take some time for lasting change to occur. Unfortunately, where studies have lasted for 6 or 12 months, they have not assessed self-esteem (see Sonstroem, 1997a). Longer studies are required which utilise comprehensive self-perception measures and evidence-based health principles.
- Studies are required that investigate degree of well-being change (such as emotional adjustment, reductions in depression, and life satisfaction) alongside self-perception change. As yet, clinical criteria attached to self-esteem or physical self-perception levels have not been developed, so it remains difficult to attach practical significance to self-esteem change scores.

Implications for practice

- Greatest self-perception/self-esteem improvements are likely to occur in those groups who have the most to gain physically from exercise participation. This includes those who are in poor physical condition such as the middle-aged, the elderly and the overweight and obese.
- Greatest improvements are also likely to occur in those who are initially low in self-confidence, self-esteem, physical self-worth, and body image, including women in general, those with mild depression,

physically disabled children and adults, overweight and obese adults and children, and perhaps offenders.

- Currently there is greatest support for the effectiveness of cardiovascular exercise and weight training programmes.
- Not enough is known about the effectiveness of specific exercise characteristics but it seems wise to focus on exercise that is moderately demanding for the population, with sessions optimally lasting in the region of 60 minutes.
- Programmes should last at least 12 weeks with some form of contact continuing for 6 months or more. Limited evidence presented here suggests that global changes in self-esteem and identity are more likely given longer intervention.
- Adherence factors cannot be separated from those which promote self-esteem. On the one hand, the programme cannot be effective without participation and on the other, mental benefits are associated with sustained adherence. In this sense, conditions which affect the attractiveness of the exercise programme, such as the qualities of the leader or the exercise setting, may be critical to changes in self-esteem.

Final comments

Exercise and sports participation are associated with more positive self-perceptions but this does not allow us to determine whether participation causes enhanced well-being or helps prevent mental disorders and ill-health. The evidence from intervention studies shows clearly that exercise helps people feel better about themselves and this contributes to their mental well-being and presumably their quality of life. This in itself suggests that health professionals should consider physical activity as an important element of health promotion. In addition, improved self-esteem is an important marker of recovery from clinical symptoms of depression and anxiety and should be systematically assessed. Similarly, physical self-worth has been shown to be independently associated with elements of well-being and should provide an important benchmark for success. Finally, self-esteem and physical self-perceptions are inextricably linked to motivation through choice and persistence in health behaviours, including exercise. For this reason alone, it has to be given serious consideration in any intervention. A problem facing recognition of the importance of self-esteem is that it is often seen by health professionals as an outcome rather than a cause of either well-being or ill-health. Its centrality to human functioning demands that it be given serious consideration as a determinant.

What we know

- Exercise can be used as a medium to promote physical self-worth and other important physical self-perceptions such as body image. In some situations, this improvement is accompanied by improved self-esteem.
- Physical self-worth carries mental well-being properties in its own right and should be considered as a valuable end-point of exercise programmes.
- Positive effects can be experienced by all age groups but there is greater evidence of change in children and middle-aged adults.
- These effects can be experienced by men and women.
- Effects are likely to be greater for those with low self-esteem but these individuals may be difficult to attract into programmes.
- Several types of exercise are effective in changing self-perceptions but there is most evidence to support aerobic exercise and weight training, with weight training indicating greatest effectiveness in the short term.

What we need to know

- The degree to which self-perception and self-esteem change is accompanied by reductions in clinical symptoms, indicators of emotional adjustment and general well-being.
- More about the mechanisms of change.
- More about the optimal conditions under which mechanisms might operate.
- More about which populations are responsive to which mechanisms.
- More about which individual characteristics increase responsiveness to mechanisms of change.
- More about some populations that might particularly benefit from exercise including the elderly, the obese, those with mental disorders, and those with physical disability.
- More about the dynamics of change. Little is known about how long it takes to produce changes, and how long they last.
- More about the conditions under which improvements in self-esteem and self-perceptions are inhibited.
- More about those who do not volunteer for studies or who drop out and do not feature in the results.

- How much change in self-esteem scores is necessary for a meaningful impact on functioning, behaviours and well-being. To date, insufficient evidence has become available to develop clinical criteria and targets of change.

Acknowledgements

Appreciation is extended to Emma Stratton M.Sc. and Dave Carless M.Sc. for their assistance in preparing this review.