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Autonomy and control of behaviour in health promotion settings: influences on self-perceptions and other critical constructs

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**Autonomy and control of behaviour in health promotion
settings: Influences on self-perceptions and other critical
constructs**

by

Manolis Georgiadis

Doctoral Thesis

Submitted in partial fulfilment of the requirements

for the award of

Doctor of Philosophy of Loughborough University

March, 2003

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To my parents Michali and Efi. Their unconditional support has made me the person I am.

Contents

| | |
|---|-----------|
| <i>List of figures</i> | viii |
| <i>List of tables</i> | ix |
| <i>Acknowledgments</i> | xi |
| 1. Introduction | 1 |
| 1.1 <i>Physical Activity and Health</i> | 3 |
| 1.2 <i>Physical Activity and Mental Health</i> | 4 |
| 1.3 <i>Summary</i> | 4 |
| 2. Review of Literature | 5 |
| 2.1 <i>The Nature of the Self</i> | 6 |
| 2.2 <i>Exercise and Physical Self</i> | 9 |
| 2.3 <i>Method</i> | 10 |
| 2.3.1 <i>Systematic Review</i> | 10 |
| 2.4 <i>Results</i> | 11 |
| 2.4.1 <i>Experimental Studies</i> | 11 |
| 2.4.2 <i>Psycho-educational Studies</i> | 12 |
| 2.4.3 <i>Physical Exercise Studies</i> | 13 |
| 2.4.4 <i>Longitudinal Studies</i> | 14 |
| 2.5 <i>Conclusions</i> | 15 |
| 2.6 <i>Physical Activity and Motivation</i> | 25 |
| 2.7 <i>Self-determination theory</i> | 25 |
| 2.8 <i>Goal Orientation Theory</i> | 27 |
| 2.9 <i>Prediction of Self-esteem in the Exercise Context</i> | 28 |
| 3. Study 1: The mediating role of self-determination in the relationship between goal orientations and physical self-worth in Greek exercisers | 31 |
| 3.1 <i>Introduction</i> | 32 |
| 3.2 <i>Achievement Goal Theory</i> | 32 |
| 3.3 <i>Self-determination Theory</i> | 33 |
| 3.4 <i>Method</i> | 37 |
| 3.4.1 <i>Participants</i> | 37 |
| 3.4.2 <i>Questionnaires</i> | 37 |
| 3.4.2.1 <i>Task and Ego Orientation in Exercise Q.</i> | 37 |
| 3.4.2.2 <i>Physical Self Description Questionnaire</i> | 38 |
| 3.4.2.3 <i>Sport Motivation Scale</i> | 38 |
| 3.4.3 <i>Procedure</i> | 38 |
| 3.5 <i>Results</i> | 39 |
| 3.5.1 <i>Psychometrics</i> | 39 |
| 3.5.2 <i>Reliability and Descriptive Statistics</i> | 42 |
| 3.5.3 <i>Correlation Matrix</i> | 42 |
| 3.5.4 <i>Path Analysis</i> | 43 |

| | |
|---|-----------|
| 3.6 Discussion | 45 |
| 4. Study 2: Behavioural Counselling in Obesity: Case Studies Using the Stages of Change and Self-determination Theory | 49 |
| 4.1 Introduction | 50 |
| 4.2 Body Image | 52 |
| 4.3 Self-determination Theory | 53 |
| 4.4 Stages of Change | 54 |
| 4.5 Aim of the study | 56 |
| 4.6 Method | 57 |
| 4.6.1 Questionnaires | 57 |
| 4.6.1.1 The Exercise Questionnaire | 57 |
| 4.6.1.2 The Social Physique Anxiety Scale | 58 |
| 4.6.1.3 A short version of the Physical Self-Description Q. | 58 |
| 4.6.1.4 Rosenberg's Self-esteem Scale | 58 |
| 4.6.1.5 The Minnesota Multiphasic Personality Inventory | 58 |
| 4.6.2 Procedure | 59 |
| 4.6.3 Internal External and Procedural Validity | 61 |
| 4.7 Results and Discussion | 62 |
| 4.8 Conclusions | 71 |
| 5. Study 3: Examining Motives for Weight-Loss Diets Among Greeks Using Self-determination Theory and Self-esteem: A Clustering, Longitudinal Field Study | 74 |
| 5.1 Introduction | 75 |
| 5.2 Method | 80 |
| 5.2.1 Procedure | 80 |
| 5.2.2 Sample | 81 |
| 5.2.3 Questionnaires | 82 |
| 5.2.3.1 Reasons for Dieting | 82 |
| 5.2.3.2 Social Physique Anxiety (SPA) | 82 |
| 5.2.3.3 Physical Self-perceptions | 82 |
| 5.2.3.4 Physical Activity | 83 |
| 5.2.3.5 Self-confidence | 83 |
| 5.2.3.6 Expectations of Achievement | 83 |
| 5.2.4 Data Analysis | 84 |

| | |
|--|------------|
| <i>5.3 Results</i> | 87 |
| <i>5.3.1 Descriptive Statistics</i> | 87 |
| <i>5.3.2 Correlations</i> | 88 |
| <i>5.3.3 Reliability</i> | 92 |
| <i>5.3.4 Analysis of Variance</i> | 92 |
| <i>5.3.5 Cluster Analysis</i> | 92 |
| <i>5.3.5.1 Cluster Characteristics</i> | 93 |
| <i>5.3.5.2 Cluster Changes</i> | 102 |
| <i>5.4 Discussion</i> | 105 |
| 6. Summary and Conclusions | 108 |
| <i>References</i> | 114 |
| <i>Appendix</i> | 132 |

List of Figures

| | |
|---|-----|
| <i>Figure 2.1 The multidimensional hierarchical factor model of self-esteem (adapted from Marsh, 1997)</i> | 7 |
| <i>Figure 2.2 A description of the Self-determination continuum displaying the types of motivation (adapted from Biddle and Mutrie, 2001)</i> | 27 |
| <i>Figure 3.1 Hypothesised model among the examined variables</i> | 44 |
| <i>Figure 3.2 Final model among the examined variables</i> | 45 |
| <i>Figure 4.1 Self-reported walking sessions among the individuals in the 4 conditions</i> | 64 |
| <i>Figure 4.2 Characteristics of the individual in the autonomy condition</i> | 65 |
| <i>Figure 4.3 Characteristics of the individual in the non self-determined condition</i> | 66 |
| <i>Figure 4.4 Characteristics of the individual in the education condition</i> | 67 |
| <i>Figure 4.5 Characteristics of the individual in the control condition</i> | 68 |
| <i>Figure 5.1 Description of the 3 clusters for the 1st data set (z-scores)</i> | 94 |
| <i>Figure 5.2 Description of the 3 clusters for the 2nd data set (z-scores)</i> | 95 |
| <i>Figure 5.3 Description of the 4 clusters for the 3rd data set (z-scores)</i> | 96 |
| <i>Figure 5.4 Description of clusters for the 1st data set based on the z-scores of all the examined variables</i> | 97 |
| <i>Figure 5.5 Description of clusters for the 2nd data set based on the z-scores of all the examined variables</i> | 98 |
| <i>Figure 5.6 Description of clusters for the 3rd data set based on the z-scores of all the examined variables</i> | 99 |
| <i>Figure 5.7 Details of cluster changes in each data set</i> | 100 |

List of Tables

| | | |
|-----------|--|----|
| Table 2.1 | <i>Cut-off values to assess the strength of association for different test statistics.</i> | 17 |
| Table 2.2 | <i>Experimental studies addressing the relationship of various constructs and treatments with self-perceptions</i> | 18 |
| Table 2.3 | <i>Experimental studies addressing the effect of exercise on self-esteem and physical self-perceptions</i> | 20 |
| Table 2.4 | <i>Longitudinal studies measuring the effects of various constructs on self-esteem and other physical-self ratings and the effects of self-esteem on various constructs</i> | 23 |
| Table 3.1 | <i>Psychometric properties of the TEOEQ questionnaire</i> | 39 |
| Table 3.2 | <i>Psychometric properties of the PSDQ questionnaire adapted for the Greek population</i> | 40 |
| Table 3.3 | <i>Psychometric properties of the Sport Motivation Scale adapted for Greek exercisers</i> | 41 |
| Table 3.4 | <i>Descriptive statistics and alphas of the variables in focus</i> | 42 |
| Table 3.5 | <i>Correlation matrix of the variables in focus</i> | 43 |
| Table 4.1 | <i>Processes, behavioural and cognitive characteristics according to Stages of Change of the Transtheoretical Model of behavioural change (Prochaska & DiClemente, 1983)</i> | 55 |
| Table 4.2 | <i>Autonomy vs. non self-determined condition directions received during the treatment</i> | 60 |
| Table 4.3 | <i>Description of the participant's characteristics for each condition of the study.</i> | 63 |
| Table 5.1 | <i>Number and descriptives of clusters for each data collection</i> | 86 |
| Table 5.2 | <i>Clustering solutions and degrees of external validity for each data set</i> | 86 |
| Table 5.3 | <i>Descriptive statistics of the all the data sets.</i> | 87 |

| | | |
|------------------|--|-----|
| <i>Table 5.4</i> | <i>Correlations among the examined variables of the 1st data set.</i> | 89 |
| <i>Table 5.5</i> | <i>Correlations among the examined variables of the 2nd data set.</i> | 90 |
| <i>Table 5.6</i> | <i>Correlations among the examined variables of the 3rd data set.</i> | 91 |
| <i>Table 5.7</i> | <i>Details of cluster changes in each data set.</i> | 104 |

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Abstract

Motivation for change has long been an aspect of dispute and discussion in Psychology as different theories and disciplines have been applied to the necessities and needs of behaviour change (Miller and Rollnick, 1991). One theory that deals with the social-contextual conditions of behavioural change and psychological development is *Self-determination Theory* (Deci and Ryan, 1985; Ryan and Deci, 2000). According to this, an *autonomous-authentic* or *self-determined* behaviour seems to have an increased significance in the level of self-esteem felt by the individual (Deci and Ryan, 1985). The aim of the current thesis was to examine the impact of the four types of external regulation on physical and global self-perceptions, in different health promotion settings. After a systematic review examining the effects of various interventions on the level of self-esteem, 3 studies were attempted, examining the impact of *autonomous* versus *controlling* motives on self-perceptions. In the first study *Self-determination Theory* (Deci and Ryan, 1985) and *Goal Orientation Theory* (Nicholls, 1989) were examined in relation to factors affecting *Physical Self-worth (PSW)*, using a cross-sectional research method. In the second study, the effects of a counselling programme on self-esteem ratings and exercise patterns, were investigated using behavioural techniques through the application of the *Transtheoretical Model* (Prochaska, Norcross, and DiClemente, 1994). Based on the findings of the first study, its aim was to experimentally examine the effects of 4 different counselling conditions (a. Autonomous, b. Non self-determined, c. Educational, and d. Control) utilising a single case experimental design. Based on the findings of the two previous studies, the aim of the third was to cluster individuals in the first 6 months of their efforts to control their body weight, employing the *Self-determination Theory* (Deci and Ryan, 1985) and Self-esteem formation (Fox, 1997). As the premises of *Self-determination Theory* (Deci and Ryan, 1985) were confirmed in various health promotion settings, the general conclusion of the current thesis is that human autonomy can be considered both a basis for self-esteem advancement and an important motivating factor in many contexts relating to health-promoting behaviours.

Key words: autonomy, control, behaviour, self-determination, self-esteem, exercise, counselling, dieting.

1. Introduction

Until the middle of the 20th century infectious diseases were responsible for a high proportion of premature deaths. The second half of the previous century in most of the developed countries premature mortality became related to “lifestyle” factors such as diet, cigarette smoking and lack of physical activity (Blair, 1988).

This resulted as humans adopted lifestyles that were quite unfamiliar until recently in terms of human evolution. This change in lifestyle brought its own health problems that are related mainly to the lack of physical activity. These problems include all the factors leading to atherosclerosis (high cholesterol, hypertension, cigarette smoking, etc.) that are related to coronary heart disease and stroke (Nieman, 1998), poor mental health, obesity, low back pain, osteoporosis and some cancers (Biddle & Mutrie, 2001).

Obesity, defined as a body mass index ($BMI = \text{Weight in kgr} / \text{Height in m}^2$) above 30, is identified in many countries as a major health problem connected to increased risks of mortality and morbidity (Garrow, 1999). It is a paradox that, in most developed countries, the increasing prevalence of obesity is occurring in an environment of lessening energy intakes. This mirrors an increasing sedentary lifestyle (Sadler, 1999).

Before analysing further the effects of physical activity on health, it is helpful to define the relevant terms: *Physical activity* can be defined as any movement of the body produced by the skeletal muscles resulting in energy expenditure (Biddle & Mutrie, 2001). This term also includes *exercise* that can be defined as any planned structured and repetitive movement aimed at improving physical fitness. Additionally, *sport* is a sub-component of exercise where the activity is rule governed, competitive and structured and comprises of gross motor movement characterised by physical strategy, prowess and chance (Rejeski & Brawley, as cited in Biddle & Mutrie, 2001).

Previous lifestyle changes have generated many studies reporting on the association between increased level of physical activity and substantial health benefits (Leon, 1997). These studies have included the determination of physical activity within the context of daily routines, occupational settings or leisure time, with activity classifications based on job category, self-reported questionnaires, or interviewer determinations. If one takes in mind the definitions of World Health Organisation (WHO) for the importance of fully functioning human beings (*1, see Appendix*) studies connecting physical activity and improved health are even more significant as improved physical fitness relates to the reduction of many mortal diseases. Evidence also exists on the ability of physical activity to improve everyday life conditions as it relates to low back pain, reduced asthma incidences, improved immune system, sleep, weight and stress management (Nieman, 1998). Thus, there is now ample evidence that the more active people are more healthy

than their inactive counterparts (Haskell, 1997; Nieman, 1998), and adversely, conclusions have connected inactivity to increased risk of disease (Caspersen & Merritt, 1995).

Nevertheless, many adults are still physically inactive in leisure time and many youth fail to engage in regular patterns of vigorous or moderate physical activity (2, *see Appendix*). For this reason, efforts to promote physical activity should be vigorously pursued (Caspersen & Zack, 1997). Within this realm, many studies have been conducted trying to understand what describes and motivates physically active people. These studies have shown that influencing a number of mediators (i.e. enhance perceived benefits) should increase the effectiveness of physical activity interventions (Marcus & Sallis, 1997). Nevertheless, humans change in many different ways and for various reasons (Miller & Rollnick, 1991), and there are many examples of human behaviour driven by short-term gratification at the expense of long-term harm (Orford, 1985). Thus, long-term effectiveness of various interventions aiming to influence physical activity is often limited as people persist in patterns of behaviour that clearly harm themselves and those around them (Miller & Rollnick, 1991).

1.1 Physical Activity and Health

Physical activity has been identified as an important element in preventing premature mortality, leading the *World Health Organisation (WHO)* and government health organisations to produce statements relative to the need for physical activity, exercise, and physical fitness. Affecting positively many health parameters such as hypertension, blood cholesterol, diabetes (both types), the immune system, and cancers, physical activity participation has been shown to be beneficial for both physiological (Haskell, 1997; Nieman, 1998) and psychological well-being (Biddle, Fox and Boutcher, 2000).

Various studies exist supporting the preventive effect of physical activity in the most active populations. Starting with the general impression being that more active people develop less *Coronary Heart Diseases (CHD)* than their inactive counterparts, recent experimental, clinical and epidemiological studies support the hypothesis that more physically active individuals have a greater resistance to the development of coronary arteriosclerosis and its clinical manifestations (Haskell, 1997). Evidence also exists supporting the protective characteristics of exercise against certain types of cancer, stroke, diabetes, osteoporosis, arthritis, cholesterol and high blood pressure (Nieman 1998).

Various determinants of physical activity have been examined trying to identify variables that appear to influence physical activity and which can be targeted for change through interventions. Of those variables, demographic, socio-cultural, and activity characteristics seem to

receive consistent support for association with physical activity. Similarly, certain psychological variables have received favourable support as determinants of physical activity. Thus, physical activity interventions should be most effective if they are targeted to foster psychological variables such as enjoyment, competence, and intentions to be active (Marcus and Sallis, 1997). Nevertheless, these variables have been proposed as being positively influenced, either acutely or chronically by exercise participation. Exercise has been increasingly considered as a means for improving the psychological well-being of both the healthy and mentally ill. It has become a therapy for coping with and managing mental illness and disorders, and a means of preventing the onset of mental health problems (Fox, Boutcher, Faulkner and Biddle, 2000).

1.2 Physical Activity and Mental Health

Several narrative and meta-analytic reviews have repeatedly supported the positive effects of exercise participation in improving mild depression, low self-esteem, high stress and poor coping skills (Morgan, 1997). Relative to the anxiety-reducing effects of physical activity, a thorough systematic review has shown that a low-to-moderate effect exists for both *state* and *trait* anxiety symptoms in a variety of sub-groups (Taylor, 2000). Further, exercise programmes have better effects when they last more than 10 weeks and the results show consistency, even when randomised controlled trials are in use, suggesting rigorous and consistent findings.

The relationship between exercise and depression has shown that both *aerobic* exercise and *resistance training* exercise may be used to treat moderate or more severe depression, usually as an adjunct to standard treatment. In addition, evidence supports a causal link between exercise and decreased depression, with no negative effects noted to the populations in focus (Mutrie, 2000).

A positive relationship has been found between physical activity and psychological well-being, expressed as positive affect and mood supported by population surveys, experimental data, and meta-analytic reviews (Biddle, 2000). *Aerobic* exercise and an emphasis on effort and self-improvement are strongly associated with positive effects.

1.3 Summary

Many studies support the positive effects of physical activity and exercise on health, while a large percentage of population in industrialised societies remains sedentary and unfit (Fox, 1999). This trend demands the need to motivate individuals towards more active lifestyles. This thesis tries to shed more light on the way individuals decide to begin and maintain exercise and other health behaviours. This examination is supported and clarified with the use of currently popular motivational theories explained in the next chapter.

2. Review of Literature

The aim of this review is primarily, to provide the theoretical background for a thorough examination of the effects of psycho-educational and exercise interventions on self-esteem and physical self-perceptions. The results of a review will provide the current trends for changing the self-perceptions in focus. After that, current knowledge on the motivational aspects of physical activity is reviewed through the discussion of two currently popular theories in physical activity namely, Self-determination (Deci & Ryan, 1985) and Goal Orientation (Nicholls, 1989) theories. Possible ways of predicting the physical component of self-esteem are finally discussed in physical activity and exercise contexts.

2.1 The Nature of the Self

One of the most interesting topics in Psychology is the self. With more than 31,000 publications over the last 2 decades of the 20th century (Ashmore & Jussim, 1997), the self is one of the most researched topics in all of psychology.

Three major human experiences form the basis of selfhood. These are a) the experience of *reflexive consciousness* (i.e., experiencing a rise or drop in self-esteem), b) the *interpersonal being* (i.e., explaining one's actions to others), and c) the *executive function* (i.e. volition and self-regulation of behaviour) (Baumeister, 1999). *Reflexive consciousness* depends on individuals' ability to have self-awareness (which involves focusing on some part of the self and comparing to certain standards and ideals), self-knowledge (involving the adaptation of self-schemas motivated by the necessity of information for self-appraisal, self-consistency and self-enhancement) and a positive sense of self-worth (or else a high level of self-esteem). The *interpersonal nature* of the self comprises of self-presentation (the effort of the self to disclose a particular image of itself), and perceiving others, using both the macro- and micro- elements of an individuals' context. The ability of the self to control its actions and regulate its emotional states and task performance refers to the *executive function* of the self.

Self-esteem, an attribute included in the reflexive consciousness of the self, is one of the most studied individual differences in personality over the last decades, due to the belief that its low ratings are responsible for the lack of a clear, stable and consistent understanding of one's self (Campbell, 1990). Further, self-esteem is a psychological construct that serves both as an outcome and as a mediating variable of human function and behaviour, and it is a construct that serves equally in the development and in the enhancement of certain behaviours (Sonstroem, 1997). Recently, self-esteem has been recognised as one of the most important factors for quality of life and psychological well-being. For this reason it has been considered as a "target variable" for public health campaigns (Fox, 2000a).

High self-esteem is associated with greater persistence facing failure, and greater resilience (Strauger & Rosenberg, 1970). Adversely, low self-esteem relates to greater vulnerability to negative everyday events, wide mood swings and affective reactions (Campbell, Chew, & Scratchley, 1991).

Based on the “symbolic interactionist theory” (Mead, 1932), the inner self starts off nearly empty and gradually fills up with information attained from other people. Thus, the new-born baby gradually gathers new self-schemas from parents and significant others about family membership, important personal traits, goals and motivations. Mead’s theory provides an explanation for the reason many programmes aiming to raise self-esteem are applied in school-contexts. These programmes are successful in raising self-esteem levels. Nevertheless, there is not enough evidence to support the claim that raised self-esteem produces reductions in many social problems (i.e., delinquency) that have been proposed to accompany low self-esteem (Baumeister, 1999).

Theoretical developments have emphasised the multidimensional nature of self-esteem and its components (Fox & Corbin, 1989; Marsh, 1997). These components are constructed by personal characteristics, competencies, attitudes and roles, and they may involve various ‘sub-selves’ such as the *family-self*, the *working-self*, the *social-self* and the *physical self* (Fox, 2000a). There is ample evidence now that these sub-components have their own hierarchical, root-like, structure with the broader self-constructs representing the main roots and the more specific sub-components indicating the finer roots (Marsh, 1997) (Figure 2.1).

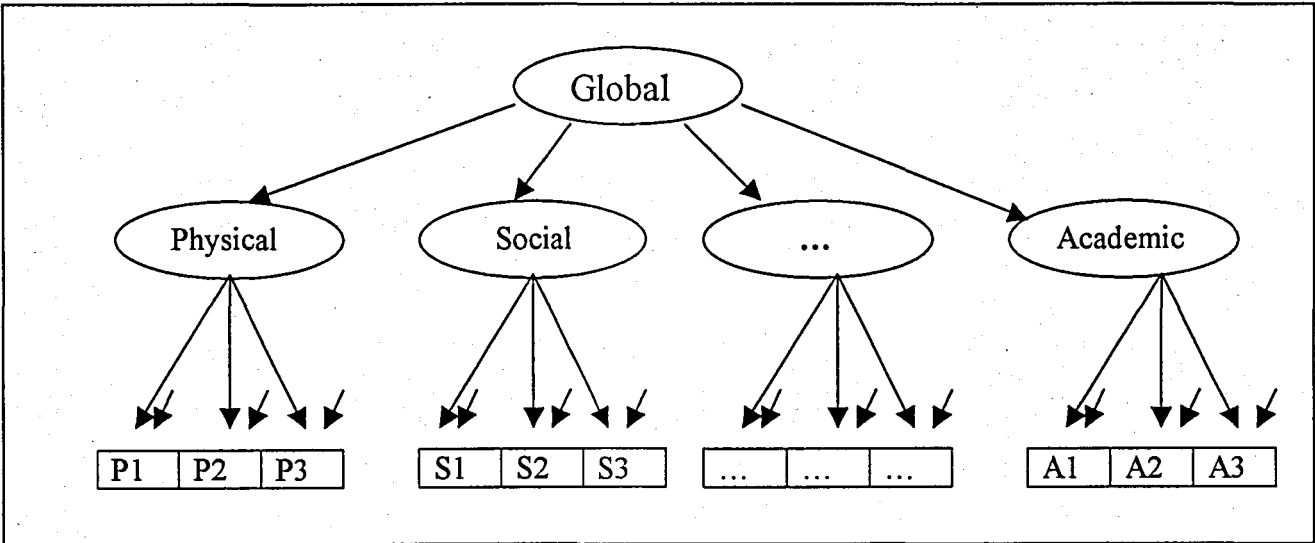


Figure 2.1. The multidimensional hierarchical factor model of self-esteem (adapted from Marsh, 1997)

One of these components, the *physical self*, has been repeatedly proposed as having great importance for global self-worth (Fox, 2000; Sonstroem, 1997). Several researchers have proposed that *physical self* plays a vital role in self-esteem system because the body provides a substantive interface between the individual and the world. Recent studies have emphasised the importance of the *physical self* in human functioning as the body and its characteristics are important means of social communication and interaction (Sparkes, 1997). Further, Western culture places great emphasis on physical appearance and values *physical self* and its components, as the body functions as a projection of characteristics such as sexuality, status and youthfulness. This is the reason why fostering *physical self* is of particular importance for global self-esteem enhancement through the life span (Sontroem & Potts, 1996).

Evidence concerning the importance of physical ratings of the self and self-esteem has been provided by correlational studies that have indicated a strong correlation ($r = .6-.8$) between these two constructs (Fox, 2000a). Further, studies of the physical self have shown associations with life adjustment as measured by mood, depression, and reported physical and psychological health.

Research has provided support for the notion that certain groups report lower levels of physical self due to cultural or developmental reasons. Obese and overweight individuals formulate such a group. Low ratings of physical self have been considered to be an inevitable reaction to obesity and this contributes to low self-esteem and self-efficacy (3, see Appendix) for any treatment attempted to overweight and obese individuals (Wardle, 1999). As there is an increased recognition of the fact that these individuals are still well above normal weight after most of the weight regulation treatments have finished, there is a need to treat low ratings of both physical self and self-esteem in those individuals.

Social exclusion, negative feedback, prejudice, misinformation and "fat phobia" in modern world have been repetitively documented and labelled relative to people with increased BMI scores (Cahnman, 1968; Wright & Whitehead, 1987). A way to oppose this trend relates to continual support in every aspect of one's life for a successful application of weight regulation regimen contributing to a "lifelong treatment" of the predisposition to conserve energy (Wilson, 1995).

This "lifelong treatment" relates also to school interventions as the individuals most at risk for developing excess body fat and eating disturbances are school-age people. Three factors give support to the studies aiming to foster self-esteem in these children: A) Criticism and social exclusion due to increased weight elicit feelings of shame that undermine social functioning from a very early age (Cahnman, 1968; Dejong, 1980). B) Efforts to control body weight are blamed

for the development of eating disorders (Cooper, 1995) contributing to the multi-factorial explanation of such chronic disorders. And C) High prevalence of dieting among the female adolescent population highlights the need for educational programmes aimed at prevention and intervention.

Characteristics of programmes aiming to foster both self-esteem and physical self, contain educational and psychological elements (Robinson & Bacon, 1996). Educating individuals is important for changing beliefs about their bodies, through the examination and change of many negative social stereotypes. Educational means are also used for changing attitudes and beliefs about attractiveness, and also, for encouraging physical exercise trying to improve physical and mental health. Psychological techniques eliciting positive changes of self-esteem relate to assertiveness training, cognitive restructuring, imagery and relaxation training (Robinson & Bacon, 1996).

2.2 Exercise and Physical Self

As the development of physical skills and competencies can be achieved through participation to sport and exercise, the potential effects of exercise involvement on *physical self* and global self-esteem should be clear. Many health professionals are becoming increasingly interested in the potential of exercise to improve mental well-being and to treat mental disorders. For this reason exercise programmes are attracting the interest of researchers and health specialists.

Summarising the effects of exercise programmes on self-esteem, Sonstroem (1996) and Fox (2000b) argued that exercise programmes increase self-esteem scores. Fox (2000b) identified 36 randomised controlled trials in the literature since 1970 and he argued that the number is quite limited, making generalisations and comparisons difficult. Two major problems he encountered in the literature were the overemphasis on certain populations (i.e., children and college students) and the exclusion of other populations (i.e., older adults). Further, poor instrumentation made the interpretation of the findings difficult. Nevertheless, taking into consideration the results of existing findings, Fox (2000b) reported a fairly high percentage of studies presenting positive changes for physical self-worth or self-concept (78%), and a more moderate percentage for the effects of exercise on global self-esteem (about half of the studies).

Fox (2000b) provided a summary of the research findings on the relationship between exercise and self-esteem. His conclusions were:

- Individuals with poor physical conditions and low ratings of self-perceptions are among the ones who will benefit more from the participation in these types of programmes.

- No matter the type of exercise activity (aerobic and/or weight training), moderate intensity activity, lasting approximately 60 min., seem to hold the best potential for self-esteem enhancement. Further, programmes should have an overall duration of more than 12 weeks, with some sort of contact continuing after 6 months.

- Conditions that make the program more attractive (i.e., characteristics of the exercise partners or the exercise environment) should be considered because they may influence the degree of change in self-esteem.

Dealing with the effects of exercise on ratings of self-esteem, various populations are considered high priority groups because they are more likely to suffer from a decline of self-confidence and self-esteem (e.g. obese individuals). A recent meta-analysis confirmed the view that overweight people have slightly lower levels of self-esteem (mean $r = -.18$; Miller & Downey, 1999). Several techniques have been proposed to target and change the psychological well-being of the obese. In a brief meta-analysis, Faith, Fontaine, Cheskin, and Allison (2000) reported a significant effect ($ES=.61$) of psycho-educational techniques on self-esteem enhancement. Nevertheless, the lack of a control group in many of the studies is a weakness.

Much of the research examining the effects of various programmes on self-perceptions, a) was based on both psycho-educational and physical exercise programmes, b) relied on uni-dimensional instruments that do not take advantage of the recent theoretical and measurement advances regarding self-perceptions, and c) was overemphasised on certain populations (i.e., college samples). The purpose of this chapter is to provide a review of studies that have examined either experimentally or longitudinally the effects of exercise and psycho-educational programmes on self-perceptions.

2.3.Method

2.3.1. Review

With an increased volume of primary research evidence presented in recent years, there is a growing need for reviews that synthesise findings. Reviews with calculated effect sizes are among the best ways to reduce large quantities of information that can then be generalised based on their consistency, magnitude and direction (Mulrow, 1995). Such reviews can contribute to an increased generalisation and consistency of the scientific findings, as well as to a reduced bias and improvement of the reliability and accuracy of recommendations (Mulrow, 1995).

The inclusion criteria for the current review were as follows: a) Papers had to follow either an experimental or longitudinal methodology; b) Both physical exercise and psycho-educational programmes were included, because it has been repeatedly suggested in the literature

that both have the potential to influence self-perceptions; c) As papers dealing with the new theoretical and measurement advancements (i.e. multidimensional instruments) of self-perceptions were published quite recently (i.e., Marsh, Richards, Johnson, Roche & Tremayne, 1994), studies published in the last 5 years (1996 onwards) were included in this review; d) Published articles in the English language were used.

Studies were excluded from this review according to three criteria: a) Unpublished articles, conference papers, dissertations, qualitative studies, and studies in languages other than English. Most cases these studies do not include enough data on group differences to calculate accurately effect sizes; b) Cross-sectional studies; c) Studies published before 1996(4, *see Appendix, Protocol of the review of literature*).

Published research in agreement with the aim of this study and dealing with various populations were identified through electronic searches using the *Social Sciences Citation Index* via *BIDS*, *PsycInfo*, *Medline* and *Sport Discus*. Keywords in the electronic search included 'Self-Esteem,' 'Physical Self,' 'Weight,' 'Exercise,' 'Physical Activity,' and 'Meta-Analysis.'

Using the selection and inclusion criteria given above, a quantitative assessment of research trends is provided through the calculation of *Strengths of Association (SoAs)*. These *SoAs* were calculated based on the 'cut-off' values presented in Table 2.1. Various test statistics were used to assess accurately *SoAs* of the reviewed studies. Where appropriate, effect sizes are compared with those of previous reviews.

2.4. Results

2.4.1 Experimental Studies

Taking account of the experimental studies from 1996, the search yielded 19 studies related to the effects of various programmes on self-perceptions involving 3053 subjects (average $n=160$). These 19 studies can be divided into a) the effects of various *psycho-educational programmes* on self-perceptions ($n=10$), and b) the effects of *physical exercise* on various self-ratings ($n=9$).

Fox (2000b) identified 36 randomised controlled studies ($N=2960$, average $N= 82$) dealing with the effects of exercise programmes on self-esteem and physical self-perceptions from 1970 until 2000. He reported more than half of these studies showing a positive effect of the various exercise programmes on physical self-perceptions (28 out of 36 studies, 78%), and about half of the studies having a positive effect on global self-esteem. Although Fox did not report the overall effect size of these 36 randomised studies his result is not in line with the results of a recent review conducted by Faith et al. (2000) that provided a *large* effect size ($r = .61$) for the

effects of 6 behavioural treatments ($n = 238$) on self-esteem ratings of various samples. Nevertheless, the lack of control groups in many of these studies does not provide for accurate estimates.

The summary of the effects for all the experimental studies (12 studies, $n=1489$) revealed a positive effect on self-perceptions, whereas 7 studies ($n=1564$) revealed no effects. Thus, a small positive effect is evident when the number of the studies is examined overall. The overall *Strength of Association (SoAs)* was *small* (see Table 2.1). This finding is in line with a recent meta-analysis by Spence and Poon (1997, as cited in Fox, 2000b) where a *small* but significant effect size was found for the effects of exercise on self-esteem. Such findings are consistent with the theoretical predictions proposing that self-esteem is the constant outcome of a wide collection of life events. For this reason, one can not easily anticipate large group changes that may take place within a few weeks due to a weekly or a bi-weekly participation in an intervention aiming to influence self-esteem perceptions (Fox, 2000b).

The number of subjects included in the studies showing no effect on self-esteem, is higher than the number of subjects included in the studies showing the opposite trend. As in the current review studies including smaller samples provided more positive effects on self ratings, it is quite likely that there is a trend supporting enhanced self ratings in studies including smaller rather than larger samples (Tables 2.2 and 2.3).

Self-perceptions were not assessed with the same instruments. This trend creates problems when trying to judge overall effects. Replication of the findings becomes more difficult when authors are using instruments especially developed for certain studies. Using instruments already validated (e.g. Harter's Self-perception Profile) could help in this regard.

The number of participants was higher in the psycho-educational studies, showing that the application of these programmes can reach more easily a higher number of participants ($N=2079$ in 10 studies) when compared with physical exercise studies ($N= 974$ in 10 studies). These numbers may also suggest that the exercise interventions need higher financial support to reach an end.

2.4.2 Psycho-educational Studies

As previously discussed, many reasons enhance the application of *psycho-educational programs*. Results of a review containing the effect sizes of these interventions are important for those trying to have an effect on individuals' self-ratings.

In these programmes, most subjects were included in the studies showing no effect of the interventions on the examined variables ($n=1382$ out of $n=2079$). This result contradicts with the

small positive effect size found, as most of the studies revealed a positive effect (6 studies out of 10). In more detail, 6 studies were related to improved self-perceptions (3 studies with *large*, 2 studies with *medium* and 1 study with *small* strength of association; $n=697$), and four studies revealed no changes in self-perceptions ($n=1382$).

Trying to better analyse the results of the psycho-educational interventions, the effects of various moderators were examined. Starting with their content, all studies aimed at the enhancement of self-esteem through education and counselling. They had common elements and they were mainly pointing at improving eating behaviour, nutritional knowledge and cognitive functioning. Their aim was mainly to change dietary attitudes to healthy and appetite-related eating habits. Self-acceptance strategies were also employed which, according to previous studies, can foster self-esteem. Comparing various self-enhancing techniques versus others, is something that needs to be considered in the future. Finally, 8 out of 10 studies were randomised trials.

Programmes were more successful when they included only women, and, conversely, a smaller effect was found for the studies related to both sexes. Seven out of 10 studies included only female samples, and 6 out of 10 studies included adolescents and children. It is clear that researchers are interested in finding ways of enhancing females' self-perceptions after Steinhart et al. (1999) argued that females show a greater deficit in self-esteem scores when compared with self-perceptions of males.

Most of the studies dealing with psycho-educational programmes included only 1 experimental stimulus per week (8 out of 10). Two studies contained 2 experimental stimuli per week, and these produced large effect sizes. In this way, the frequency of the experimental stimuli seems to be important for the results of these studies.

Examining the duration of the studies provided important clues. All the studies lasting 9 weeks or less produced *zero* effect sizes. On the contrary, 3 studies that produced a positive effect size lasted more than 10 weeks. Interventions lasting longer seem to be more successful.

Finally, four out of six studies including normal-weight individuals produced a *zero* effect size as a result of the intervention. We need experimental groups of both normal and over-weight individuals to understand more about this trend.

2.4.3 Physical Exercise Studies

Studies of the effects of exercise programmes on self-perceptions revealed 6 studies having a positive influence (3 with a small effect, $n=388$, and 3 with a medium effect, $n=404$; overall $n=792$). Three studies showed no change on various self-ratings ($n=182$). Interventions

based on *physical exercise* seem to produce a positive overall influence on various self-perceptions.

No trend was evident for gender with 7 out of 9 studies including both males and females. No trend was found for the age. Nevertheless, more studies are needed on older populations because only 1 of the 9 studies included such participants.

A clear tendency was evident for the frequency of the experimental stimuli, as most of the interventions producing an effect included experimental stimuli of 3 times per week. Further, 2 studies not producing an effect were related to 1 or 2 exercise stimuli per week. This seems quite logical, given the recommendations for health-related activity, which is five or six sessions of moderate intensity activity per week. No trend was evident for the duration of the studies, nor for the type of the assessment. A positive finding of this review is that 6 out of 9 studies used *multidimensional questionnaires* for assessing various self-ratings. This signifies a shift towards more contemporary approaches in comparison to studies reviewed previously (Sonstroem, 1997a).

No trend was found for the use of a specific type of exercise activity in the exercise programmes, with 7 out of 9 studies using a variety of exercises and sporting activities. The most frequently examined activity was that of *aerobic dance* and consequently, a limited range of physical activities was investigated. The effects of various cardiovascular activities need more thorough examination. This result is in line with Fox's (2000b) arguments about the need for examining the effects of other *aerobic* activities and *resistance training* in improving body image and self-esteem ratings. In addition, only in 1 study were participants free to choose the most interesting and enjoyable exercise activity. Because choosing a specific type of exercise activity reflects better everyday practice, we need more studies having this type of method.

2.4.4 Longitudinal Studies

Seven longitudinal studies were found dealing with the assessment of various self-constructs and physical appearance. Studies examined not only the effects of programmes aiming to improve physical appearance but also the patterns of change of these constructs, due to development and maturity.

A summary of results revealed a *small/negative* association of self-esteem with perfection and a *medium/negative* association of self-esteem with dieting, BMI, bulimic symptoms, previous dieting, and disturbed mood. A *large* association was found between self-esteem and the successful completion of various diet treatments.

The vast majority of the studies are biased towards adolescent samples with six such studies and only one adult population. Four studies examined early-adolescent samples and two studies late-adolescent samples. Accordingly, the vast majority of the studies are considered developmental in nature because they involved cross-age comparisons. As self-esteem is considered an important psychological construct in early developmental stages, longitudinal studies dealing with changes in self-perceptions have put great emphasis on this particular age group. As results showed, adolescents' self-esteem and body image is at risk in modern Western societies and this is clearly in line with the suggestions of various researchers (Fox, 1997, 2000a; Kling, et al., 1999; Page & Fox, 1997).

The overall sample participating in the longitudinal studies reviewed was 998 in 7 studies (average $n = 142$), denoting that the collection of data in longitudinal studies is demanding with high attrition. Follow-up data were gathered with an interval of 6 months (1 study), 9 months (2 studies), 12 months (3 studies) and 3 years (1 study), signifying time intervals that potentially can elicit changes in self-perceptions. Studies were based on sound methodological criteria (Thomas & Nelson, 1990) with the majority using a time interval of more than 1 year (mean duration 13.71 months).

Uni-dimensional scales measuring self-esteem were used in more than half of the longitudinal studies reviewed (4 out of 7 studies), followed by Harter's multi-dimensional self-esteem scale (3 studies). Thus, recent theoretical premises have not reached all longitudinal studies. Nevertheless, using validated questionnaires is in the right direction for reaching reliable and comparable results.

2.5 Conclusions

Based on the number of studies reviewed here, researchers are able to produce small but consistently positive changes in the self-perception ratings with the help of various strategies. Both *psycho-educational* and *physical exercise* programmes were found to elicit positive changes across various populations and study designs. Viewing the results according to the number of participants, it can be argued that interventions were marginally effective in improving various self-ratings in the examined populations.

Nationality of the participants revealed a bias towards studies taking place in North America (17 studies from USA, and 1 study from Canada representing 66% of the reviewed studies). Fourteen percent of the reviewed studies took place in Europe (2 studies from UK, 1 study from Germany, and 1 study from Norway), and eleven percent of the studies had

participants from Australia (3 studies). There was also one study from Hong Kong and one from Israel.

A variety of the theoretical and methodological suggestions discussed earlier (Fox, 2000b; Sontroem, 1998) are yet to followed consistently. According to these suggestions are the following observations:

- Participants' previous level of physical condition was not assessed in any of the studies reviewed.
- Previous level of self-ratings was not assessed. Individual scoring styles and the existence of ceiling effects in the data were not examined.
- Conditions other than the experimenters' manipulations that could make the programmes attractive (i.e. social contact) were not considered.
- Comparison of the various *psycho-education* and/or *exercise techniques* proposed in various studies has not yet been assessed.
- Exercise activities were not varied enough.
- Instruments assessing various self-perceptions still create problems with the most theoretically rigorous and reliable questionnaires not always used.
- Two (in the *psycho-education*) or more (in the *exercise*) experimental stimuli are needed for producing an effect for self-perceptions.

Previous findings were supported with negative effect sizes found between self-esteem ratings and weight pre-occupation. The examination of the effectiveness of the interventions aiming to change that pattern as early as in the pre-adolescent years is deemed important (Fox, 1997; Page & Fox, 1997). In addition, an overemphasis on certain populations was in evidence (i.e., adolescent populations especially in the longitudinal studies) paralleled with the exclusion of other populations (i.e. senior populations).

Programmes lasting sixty minutes or more still seem to hold the best potential for improving self-perceptions in various populations. Twelve weeks seems to be quite effective in improving participants' self-esteem. Finally, three experimental stimuli per week produce better results.

| Strength | Test statistic | | | | | | |
|-----------------|----------------|---------|----------|-------|----------|-------|-------|
| | r^a | r_b^b | r^{2c} | R^d | R^{2e} | d^f | w^g |
| None (0) | <0.1 | <0.1 | <0.01 | <0.14 | <0.02 | <0.2 | <0.1 |
| Small (-) (+) | 0.1 | 0.1 | 0.01 | 0.14 | 0.02 | 0.2 | 0.1 |
| Medium(--)(++) | 0.3 | 0.2 | 0.09 | 0.36 | 0.13 | 0.5 | 0.3 |
| Large(---)(+++) | 0.5 | 0.4 | 0.25 | 0.51 | 0.26 | 0.8 | 0.5 |

Note:

a. r = Pearson correlation

b. r_b = point biserial r

c. r^2 = squared correlation

d. R or Partial R from multiple regression

e. R^2 or Partial R^2 from multiple regression

f. Effect size, $d = (m_a - m_b)/SD$

g. Effect size, $w = \sqrt{C^2/(1-C^2)}$ where: C = Pearson contingency coefficient from chi-square.

Table 2.1 Cut-off values to assess the strength of association for different test statistics.

Table 2. 2 Experimental studies addressing the relationship of various constructs and treatments with self-perceptions

| Authors | Date | Subjects | Groups | Treatment | Instruments | Results | Limitation of the Study |
|---------------------|------|---|--|--|--|--|--|
| Kaminski & McNamara | 1996 | 29 female college students (Mean Age: 18.3) | 1. Experimental 2. Control (randomly assigned) | 8 weeks (90' x 1 x week) with 5 weeks follow-up. Treatment aiming to address symptoms presented in a sample of women at risk of bulimia | Rosenberg's Self-Esteem Scale (Rosenberg, 1965), Body Self-esteem Scale (Franzoi & Shields, 1984) | Large SoAs for self-esteem and body self-esteem both at post-treatment and follow up periods | 1. Uni-dimensional assessment of self-esteem, 2. Small sample size, 3. High homogeneity of sample |
| Higgins & Gray | 1998 | 82 females (Mean Age: 44.4) | 1. Experimental 2. Control | A psycho-educational program (FFD) aiming to reduce dieting and increase natural eating, consisted of 6 (2 hour x week) sessions and an introductory and follow-up session | Feelings of Social Inadequacy Scale (Janis and Field, 1979), measuring Trait Self-Esteem | 1) Large SoAs for the Trait Self-esteem for the experimental for the pre and postmeasures. 2) Medium SoAs for the increases of Self-esteem 6 and 12 months after the post test | The subjects' recruitment was made on a convenience basis, calling into question the generalisability of the results |
| Ciliska | 1998 | 78 women | 1. Psychoeducation, 2. Education, 3. Control | A 12 week (1xweek) intervention based on lectures on obesity and health (education). A 12 week (2xweek) based on cognitive therapy strategies and the education program | Rosenberg Self-esteem Measure (Rosenberg, 1965) | Large SoAs for the effects of the Psychoeducation treatment (on Self-Esteem) in relation to Control & Medium SoAs (for the same variable) in relation to the education group. | Uni-dimnsional assessment of self-esteem |
| Steinhardt et al. | 1999 | 357 adults (Mean Age: -) | 1. Tradition Weight Control, 2. Diet Free Forever, 3. Control, 4. Non-volunteer comparison group | 10 week intervention (1 x week) and 1 year follow-up | An instrument measuring Physical Self-esteem based on Rosenberg's Self-esteem Scale (Field & Steinhardt, 1992) | Large SoAs for Physical Self-esteem in the case of the DFF and TWC (approached Large). Medium SoAs of the Control for the same variable | Not true-experimental – The effects of follow-up sessions were not analysed. |

| | | | | | | | |
|-----------------|------|--|--------------------------------------|--|---|--|--|
| O'Dea & Abraham | 2000 | 173 adolescent males and 297 adolescent females (Mean Age: 13.0) | 1. Intervention, 2. Control group | An educational program (aiming to improve body image by building general self-esteem) consisted of 9 weekly sessions (50-80min) with homework activities | 1. Self-perception profile for adolescents (Harter, 1982), 2. Physical Appearance Ratings (O'Dea, et al., 1996) | Zero SoAs was found for Physical appearance ratings and Body dissatisfaction reductions (low significant results in the comparison of the means) | An unknown assessment of physical self-perceptions |
| Phelps et al. | 2000 | 530 female middle school students (Mean Age: 13) | 1. Experimental 2. Control | 6 weeks (1 x week) eating disorder prevention program based on personal exploration and evaluation | Multidimensional Self-Concept Scale (Bracken, 1992) | Zero SoAs for the positive improvements in Physical Self-Concept | Lack of follow-up measures |
| Phelps et al. | 2000 | 312 female high school students (Mean Age: 14.5) | 1. Experimental 2. Control | 6 weeks (1 x week) eating disorder prevention program based on personal exploration and evaluation | Multidimensional Self-Concept Scale (Bracken, 1992) | Zero SoAs for the positive improvements in Physical Self-Concept | Lack of follow-up measures |
| Phelps et al. | 2000 | 63 female college students (Mean Age: 21) | 1. Experimental 2. Control | 4 weeks (90' x 1 x week) eating disorder prevention program based on personal exploration and evaluation | Multidimensional Self-Concept Scale (Bracken, 1992) | Medium SoAs for the improvement of physical self-esteem only in the case of the experimental group | 1. Experimental and control groups not randomly assigned. 2. No pre-treatment measures for the control group |
| About & Black | 2000 | 70 female university athletes (Mean Age: 19) | 1. Experimental 2. Control | 8 weeks (1x week) educational program aiming at improvements of self-esteem, stress management, nutrition knowledge and goal setting | Rosenberg's Self-Esteem Scale (Rosenberg, 1965) | Zero SoAs for self-esteem in the case of the experimental group. Large SoAs for self-esteem reduction in the case of the control group | Uni-dimensional assessment of self-esteem |

| | | | | | | | |
|-----------------|------|--------------------------|--|--|---|---|--|
| Ramirez & Rozen | 2001 | 88 adults (Mean Age: 44) | 1. Weight control 2. Weight control plus body image therapy (randomly assigned) | 16 week intervention (1 x week) aiming either (a) to promote eating and exercise change or (b) the previous goal plus trying to reduce appearance-related distress and preoccupation | Rosenberg's Self-Esteem Scale (Rosenberg, 1965) | Medium SoAs on self-esteem improvements for both conditions at post-treatment and follow-up periods | 1. Uni-dimensional assessment of self-esteem, 2. Both treatment groups had components that could influence body-image and self-esteem, 3. Not an individualised body-image therapy |
|-----------------|------|--------------------------|--|--|---|---|--|

Table 2.3 Experimental studies addressing the effect of exercise on self-esteem and physical self-perceptions

| Authors | Date | Subjects | Groups | Treatment | Instruments | Results | Limitation of the Study |
|-------------------------|------|---|--|---|--|--|--|
| Sorensen, M. et al. | 1999 | 208 adults (Mean Age: 44.9), 191 males and 17 females | 1. Exercise only, 2. Exercise + Diet, 3. Diet only, 4. Control | One year exercise program (3 x week) including approximately, 60% aerobics, 25% circuit training, and 15% jogging or fast walking | General Health Questionnaire (Goldberg & Williams, 1991) | Medium SoAs for the Self-esteem subscale in favour of the Exercise group in relation to both of the other groups (Diet and Control groups) | The use of a self-esteem subscale made exercise effects less obvious (than using an assessment of physical self) |
| Marquez-Sterling et al. | 2000 | 15 women (Mean Age: 29.55) | 1. Exercise, 2. Control | 15 weeks, 3 x week | Body Cathexis Scale (Sekord & Sekord, 1953) | Medium SoAs in favour of the exercise program for the subscales of Body Cathexis Scale (mean Effect Size) | 1. No of subjects. 2. Differences on physical self-perceptions measured only by Body Cathexis questionnaire. |

| | | | | | | | |
|-------------------------|------|---|--|---|---|---|--|
| Walters & Martin | 2000 | 147 children (grades 3 to 5) | 1. Aerobic Exercise 2. Control (Strength and motor skills activities) | 13 weeks, 1 st Group: 30-40 min., 5 x week aerobic activities, 2 nd Group: 20-30 min., 5 x week strength and coordination exercises | Self-Perception Profile for Children (Harter, 1985), | Small SoAs in favour of the control group (strength and conditioning exercises) | 1. The presence of ceiling effect as both pre- and post treatment scores were high (need for more sensitive instruments) |
| Alfermann & Stoll | 2000 | 24 adults (experimental group) (Mean Age: 36.7), and 13 adults (control) (Mean Age: 39.3) | 1. Exercise 2. Control | 6 months (1 x week) a combination of aerobic, strength and conditioning program | Scales developed by the authors: 4 subscales measuring physical self-worth, and 2 subscales measuring self-esteem | 1. Medium SoAs was found in favour of the exercise group for the reduction of negative Physical Self-Worth and 2. For the reduction of the Concerns about Physical Attractiveness. No significant differences were found for self-esteem and physical self-worth. 3. Zero SoAs was found for Global Self-esteem and for the Positive Self-worth | Small sample size and differences in social support between the 2 groups (in favour of the experimental group) |
| Alfermann & Stoll | 2000 | 93 adults (Mean Age: 43.2) | 1. Aerobic exercise (i.e. jogging), 2. Strength, aerobic and conditioning exercise, 3. Relaxation (control), 4. Back exercises (control) | 6 months (2 x week) according to the content of each experimental and control group | Scales developed by the authors: 4 subscales measuring physical self-worth, and 2 subscales measuring self-esteem | Zero SoAs for all the examined variables in the comparison of the exercise groups with the control groups | Small sample size obscured potential differences among groups to emerge |
| Herman-Tofler & Tuckman | 1998 | 52 third grade students | 1. Experimental (Aerobic Class) 2. Control (Traditional P.E. class) | 8 weeks (3 x week) aerobic exercise sessions Vs a traditional P.E. program | Self-Perception Profile for Children (Harter, 1985) | Zero SoAs for Global Self-Worth and Physical Appearance | |

| | | | | | | | |
|-----------------|------|---|---|--|---|---|---|
| Stewart et al. | 1997 | 89 seniors (Mean Age: 76.9) | 1. Exercise 2. Control | Six month exercise intervention program (3-5 x week) of moderate intensity physical activities | Questionnaire used in Medical Outcomes Study Approach (Stewart & Ware, 1992) | Small SoAs for Self-esteem only in the case of the experimental group. | Particular characteristics of the sample and the community exercise facilities that make the program not easily replicable |
| Boyd & Hrycaiko | 1997 | 181 adolescent females (Mean Age: 12.5) | 1. Physical Activity Intervention, 2. Traditional Physical Activity Program (Control) | A 6-weeks cooperative intervention program focused on raising students' physical self-image by increasing their prowess, strength and muscular endurance | Self-description Questionnaire I & II (Marsh, 1988; 1990) | Medium SoAs for Total Self-Esteem and Physical Appearance scales in favour of the intervention group for the pre-adolescent age group only. Small SoAs in favour of the subjects with lower pre-treatment scores of Self-Esteem (pre-adolescent age group). | Small sample size and the initial high levels of self-concept may have contributed to ceiling effect and the lack of statistically significant effects for the whole sample |
| Ng & Tam | 2000 | 152 persons received cardiac surgery | 1. Exercise-based cardiac rehabilitation program, 2. Control group (no exercise) | A 2-month program (2xweek) based on cardiopulmonary and strength exercises | Adult Source of Self-esteem Inventory (Elvoson and Fleming, 1989), and the Mobility Scale of New York Heart Association | Small SoAs for Self-esteem in favour of the Exercise Rehabilitation group. | Social support may have influenced the results in favour of the Exercise group. Sample size of the Rehabilitation group significantly smaller than that the Control group |

Table 2.4 Longitudinal Studies measuring the effects of various constructs on self-esteem and other physical self ratings and the effects of self-esteem on various constructs

| Study | Date | Participants | Method | Variables Examined | Instruments | Findings | Limitations |
|--------------------------|------|--|--|---|--|---|---|
| Neumark- Sztainer et al. | 1997 | 143 adolescent females (Starting Mean Age: 15.3), (Final Mean Age: 17.6) | A 3-year longitudinal study assessing the variables in focus | Dieting behaviours, BMI, Self-esteem, Body Dissatisfaction | Rosenberg's Self-acceptance scale (Rosenberg, 1956), Various subscales of the Eating Disorders Inventory (Garner, Olmstead and Polivy, 1983) | 1. Medium SoAs for lower self-esteem as a predictor variable of dieting in early adolescent years 2. Large and medium Strengths of Association for body Dissatisfaction with dieting for late and middle adolescent years respectively. 3. Higher self-esteem ratings for late adolescent years | Small and homogeneous sample. Uni-dimensional measurement of variables in focus |
| Keel et al. | 1997 | 204 early adolescent boys and girls (6 th and 7 th grade students) | 1 year re-examination of body image and self-esteem to the development of eating disorders | Body Image and Self-esteem and attitudes and behaviours consistent with eating disorders | Body Image subscale of the Self-Image Questionnaire for Young Adolescents (Petersen et al., 1984), Rosenberg's self-esteem scale (Rosenberg, 1965), EAT-26 (Brooks-Gunn et al., 1989), Children's Depression Scale (Kovacs, et al. 1977) | 1. Large SoAs of Body Image and Self-esteem with Depression (negative), and Eating Disorders (Medium for males) for both sexes. 2. Medium SoAs of Self-esteem and BMI (negative) for males. 3. Small negative SoAs of Body Image and BMI for males. | Homogeneous sample, with no SES diversity |
| Sands et al. | 1997 | 61 early adolescent boys and girls (Age ranging from 10 to 12 years) | 3 measures of the examined variables were made within a period of 9 months | Self-esteem, Physical Activity Participation, Body Image Scale, Body Dissatisfaction, Dieting and Bulimia | Self-worth subscale of SEQ questionnaire (Harter, 1982), Body Image Scale (Fallon & Rozin, 1985), Eating Disorder Inventory subscales (Garner & Olmstead, 1984) | 1. Medium negative SoAs was found for Self-esteem and body dissatisfaction. 2. Positive self-esteem had medium SoAs with Ideal body shape. 3. Self-esteem had a medium negative SoAs with Drive for Thinness (subscale of the Eating Disorder Question.) | |

| | | | | | | | |
|------------------|------|---|--|---|--|--|---|
| Vohs et al. | 1999 | 342 female college students (Mean Age: 17.6) | 1 st assessment on the Spring of final year in high school, & 2 nd assessment during the following academic year | Perfectionism, BMI, Self-esteem | Perfectionism subscale of the Eating Disorder Inventory (Garner et al., 1983), State Self-esteem Scale (Heatherton & Polivy, 1991) | 1. Medium negative SoAs of Self-esteem, and a. Bulimic symptoms and b. high perceived weight status, and 2. Small negative SoAs between Self-esteem and perfectionism. | |
| Foster et al. | 1997 | 60 women (Mean Age: 40.0) | Examination of body image and other variables at the beginning, during and after 48-week weight loss program | Body-image, Mood, Self-esteem, and dieting history | 2 subscales of the Multidimensional Body-Self Relations Questionnaire (Cash, 1994) assessing body image, Rosenberg Self-esteem scale (Rosenberg, 1979). | <u>Before Diet</u> : Medium negative SoAs of Body Image with Disturbed Mood and Previous Diets. <u>After Diet</u> : Large SoAs for Body Image Improvements in relation to baseline, & Medium negative SoAs between Body Image and lack of weight loss. | University derived sample |
| Sands et al. | 1997 | 61 preadolescent school children (Mean Age: 11) | 3 assessments within the Academic school year (every 3 months) | Self-esteem, Body-image, Physical Activity Participation, and Eating Disorders | Self-esteem questionnaire (Harter, 1982), Physical Activity Participation Q., Body-image Scale (Fallon & Rozzin, 1985), Eating Disorder Inventory (Garner & Olmstead, 1984) | A Medium SoAs between Self-worth and Ideal Body Shape for the whole sample. No significant correlation between physical activity and other variables | Small sample size |
| Archibald et al. | 1999 | 127 early adolescent girls (Mean Age, 1 st Year: 12.19; 2 nd Year: 13.15) | 2 measures in 2 consecutive years (1 year apart) | Dieting Attitudes and Behaviours, Body Image, Parent-Adolescent relationships, Pubertal Development | Diet Subscale of Eating Attitude Test (Garner & Garfinkel, 1979), i) Body Image Scale and ii) Family Relationships Scale of the Self-Image Questionnaire for Young Adolescents (Petersen et al., 1984) | Medium SoAs of the positive parental relationships on positive Body Image in the 1 st year of assessment. Small SoAs between the 1 st year's parental relationships and the 2 nd year's Body Image. | Results can only be generalised only to the same socio-demographic group (white upper-middle class early adolescent fem.) |

2.6 Physical Activity and Motivation

Epidemiological studies have shown that physical activity levels, at a level that is likely to produce positive health effects, is low and becomes lower with increasing age (Fentem and Walker, 1995). Further, it is likely over the past 30 years that life-style activity has reduced because of greater reliance on motorised transport, sedentary home entertainment and labour saving devices. However, such trends are not entirely clear. Evidence also suggests that any increase in energy expenditure in leisure time can not compensate for this elimination of physical work in the daily routine (Fox, 1999).

As health behaviour is one of the most challenging fields for health promotion, a strong emphasis on the motivation processes is involved when individuals need to actively maintain their health with behaviours, such as increased levels of physical activity (Biddle & Mutrie, 2001). After almost a decade of descriptive studies dealing with the motives and barriers related to participation, and reasons for ceasing physical activity, a more theoretically based research agenda becomes apparent.

As motivation relates to all aspects of human activation and intention leading to behavioural acts, the motivational aspects of human behaviour were used to explain exercise participation. Various motivational constructs have been used to explain the complex psychological, environmental, social and biological influences of physical activity involvement (Biddle & Mutrie, 2001). One theoretical framework that examines the reasons behind human actions, trying to make sense of the observed variations in human behaviour, is *Self-determination Theory (SDT)* (Deci & Ryan, 1985). This theory provides a way to look at the links between selfhood and control of behaviour explaining how the self regulates and motivates itself to exert control over its environment (Baumeister, 1999).

2.7 Self-Determination Theory

Based on the *cognitive perspective* of Humanistic approaches in psychology and fostering the theoretical views of White (1959) and DeCharms (1968), Deci and Ryan (1985) proposed the *SDT*. These theorists argue that there are three basic psychological needs (competence, autonomy and relatedness) related to intrinsic motivation and to the self-determination of human behaviour. More precisely, the need for competence relates to mastering experiences and feelings of personal accomplishments. Autonomy refers to the personal control one feels when being the origin of one's

own behaviour. Finally, the need for relatedness is associated with efforts to be related to and cared for by others. The level of accomplishing each of these needs can be used to describe both the circumstances in which intrinsic motivation can be advanced and the internalisation process of extrinsically motivating behaviours.

According to SDT (Deci and Ryan, 1985; 1991), internalisation of initially non-intrinsically motivating behaviours can vary based on a continuum ranging from extrinsic motivation at one end and intrinsic motivation at the other. Within this continuum, there are four main types of extrinsic motivation, or else, four processes of internalisation (*external regulation*, *introjected regulation*, *identified regulation*, and *integrated regulation*) of an initially externally regulated behaviour. *External regulation* describes a behaviour performed out of rewards or threats. *Introjected regulation* represents a more internal adjustment of behaviour emanating from guilt and concerns of approval by significant others. *Identified regulation* describes more acknowledged and appreciated reasons for doing the particular behaviour as feelings of "I want to" have taken the place of feeling obliged to perform the task at hand. Finally, *integrated regulation* represents the most self-determined form of regulation, as a person's behaviour is in accordance with one's own personal goals.

In all the above types of regulation, behaviour is performed for the purpose of achieving personal goals, even when it matches with the identity of the one performing the activity, as in the case of *integrated regulation*. This is in contrast to intrinsic motivation, which relates to performing a particular behaviour for fun, enjoyment and the activity itself (Deci and Ryan, 1985).

In addition, lack of motivation (amotivation) has been proposed as a state where individuals do not possess the motivation to perform the particular behaviour. This is mainly due to reasons of inconsistency between actions and outcomes or else due to the inability to find any reasons for continuing the particular behaviour. The performer lacks the efforts and strategies to continue (Vallerand and Fortier, 1998). Linking all previously discussed types of motivation into one, a continuum of *self-determination* can be displayed ranging from *amotivation* at one end to *intrinsic motivation* at the other, with the four types of external regulation being in the middle (see Figure 2.2).

perspectives are linked to different cognitive, behavioural and affective outcomes in academic (Nicholls, 1989) and sporting contexts (Duda, 1993; Duda and Hall, 2001). A more adaptive motivational pattern is generally associated with *task-oriented* goals and a less positive pattern is associated with *ego-oriented* goals, with the latter being dependent on various factors. A recent systematic review examining correlates of goal orientations in physical activity has concluded that a high task, either singly or in combination with a high ego orientation, contributes to more positive or adaptive psychological profiles (Biddle, Wang, Kavussanu & Spray, 2002).

Both goals are related to self-esteem. Several studies led by the theoretical notions of *SDT* have shown that in conditions of increased pressure, people are in a state of ego-involvement and they will feel various controlling agents undermining their autonomy to act (Deci and Ryan, 1987). This has been termed "contingent" self-esteem. Where self-esteem does not rely on meeting external factors and is based on achieving personally valued standards it is referred to as "true" self-esteem. Nicholls (1989) also discussed the effects of judging competence, based on personal versus externally-focused criteria, and its effect on self-esteem. He argued that achieving competence while relying only on one's own efforts would lead to positive self-evaluations and consequently to high self-esteem.

2.9 Prediction of Self-esteem in Exercise

As physical activity is important for the maintenance of good physical and psychological health, and for achieving a good quality of life (WHO, 1995), it is essential that we find better ways to promote this kind of behaviour. Human motivation and self-esteem enhancement can have a significant role in the promotion of such a behaviour. It is obvious that both motivational constructs previously discussed have overlapping elements and that the combination of *competence*, *autonomy* and *sense of identity* could prove important for understanding motivation, achievement, and self-esteem (Biddle, 1997). More precisely, looking at the exercise context, one could argue for the need to examine which way is best for fostering self-esteem: through the enhancement of *competence*, *autonomy* or both? Do certain types of competence enhancement contribute more to self-esteem than others?

Consequently, based on the theoretical notions presented, it is not clear which are the best conditions for fostering physical self-worth and global self-esteem in the exercise setting. Both of the motivational constructs reviewed seem to hold promise for explaining behaviour with regard to exercise, and propose adaptive psychological profiles under certain conditions. *SDT* (Deci and Ryan,

1985; 1987) proposes its rationale on the fulfilment of the three psychological needs of *competence, relatedness and autonomy*. This theory could be considered more holistic, predicting in a better way self-esteem than *Achievement Goal Orientation Theory*, which relies only on the explanation of human behaviour through the competence need.

In the same way, are the consequences of an autonomous versus a controlling environment or an individual's orientation towards more autonomous-supportive or controlling-supportive factors so essential for explaining behaviour? Do behaviours emanating from free choice show any difference, relative those not allowed a choice, in terms of self-esteem enhancement for the active participants in an exercise context?

It has already been discussed that according to the "self-enhancement" model (Fox, 1997), people tend to engage in the behaviours they feel more competent. For example, if one feels competent in the exercise domain it is more likely that one will want to demonstrate that competence and hence be motivated to exercise. The behavioural effects of demonstrating competence, either through task completion and effort exerted or through outperforming others, has been examined quite thoroughly in sporting and physical education environments. Nevertheless, the motivational consequences of the two goal perspectives in the exercise context and their connection with self-esteem has not been fully examined. Does the positive connection between task orientation and positive psychological states proposed (Ntoumanis and Biddle, 1999) exist in the exercise setting or do relationships among these variables change due to the different meaning of achievement?

These questions necessitate the examination of motives that exist among exercisers and which have an effect on self-perceptions. A better understanding of the conditions that enhance self-perceptions could advance our knowledge in this field significantly. It could assist practitioners in their efforts to promote and sustain exercise behaviour through feelings of increased competence and positive psychological states.

In this thesis three studies are reported. In the first study *SDT* (Deci & Ryan, 1985) and *Achievement Goal Orientation Theory* (Nicholls, 1989), are examined trying to explain factors affecting *Physical Self Worth*. In the second study the effects of a counselling programme on self-esteem ratings, exercise behaviour and adaptive eating patterns are examined using behavioural techniques through the application of the *SDT* (Deci & Ryan, 1985) and the *Transtheoretical Model* of behavioural change (Prochaska, Norcross, & DiClemente, 1994).

In the final study, the aim is the examination of the motivational determinants of dieting, clustering individuals in the first 6 months of a weight regulation programme. The theories of *SDT* (Deci & Ryan, 1985) and *Self-esteem* formation (Fox, 1997) guides cluster analysis for three data sets collected over a period of six months.

Each one of these studies includes different method. Thus, theoretical premises need to be reviewed repetitively and according to the aim of each study.

**3. Study 1: The mediating role of self-determination in the
relationship between goal orientations and physical self-worth in
Greek exercisers**

3.1 Introduction

Although the links of physical activity and health have been well documented (Nieman, 1998), many people are either sedentary or less active than they should be to accrue health benefits (Dubbert, 1992; Caspersen, Christenson & Pollard, 1986). On the other hand even when the psychological and physiological benefits of exercise are presented through community-wide interventions and people start to engage in various physical activities, adherence is typically quite low (Biddle & Fox, 1989; Dishman, 1982). This clearly supports the need to promote physical activity. Human motivation theories can have a central role in the advancement of our knowledge on what initiates and sustains health behaviours. The social-cognitive perspective has become a popular approach in the study of human motivation (Biddle, 1997), and such theories have repeatedly been proposed to influence exercise behaviour (Brawley and Rogers, 1993).

3.2 Achievement Goal Theory

One of the most popular motivation theories in understanding people's definition of success is achievement Goal Orientations Theory. Goal perspective theory was based mainly on research in academic settings. Nicholls (1984; 1989), Ames (1984a, 1984b), and Dweck (1986), theorised that individuals interpret competence, ability and success in at least two different ways. The first type is when people are task oriented and seek personal improvement and task mastery. The other is the ego goal orientation when people seek to prove themselves through outperforming others.

For ego oriented people ability is differentiated from effort. On the other hand, in task oriented individuals ability stems from within, it comes from self-progress and in this way effort and ability are undifferentiated. Perceived competence is thought to play a role in the behaviour of the ego-oriented individuals. A high ego oriented person with low perceived ability is less likely to choose challenging tasks as (s)he is likely to demonstrate incompetence. This could lead to loss of motivation and consequently to task avoidance. Nevertheless, an ego oriented individual with high perceived competence is unlikely to suffer any motivational impairment (Duda, 1993). The level of perceived competence does not have any motivational effect when one is task oriented, as self-referenced improvement is the target of behaviour. Those

theoretical tenets, however, have met with mixed results in sport and exercise psychology, as perceived competence may be an important characteristic for task oriented individuals too (Biddle, Soos, and Chatzisarantis, 1999; Lintunen, Valkonen, Leskinen, and Biddle, 1999; Vlachopoulos and Biddle, 1997).

Task-oriented individual's behaviour is an end in itself and it could be conceptualised as intrinsically motivating and satisfying. On the other hand, an ego oriented person's acts are done trying to construe superiority over others which refers to doing something because it leads to a separate outcome having a more external locus of causality (Nicholls, 1989). With this intrinsic-extrinsic differentiation of behaviour in mind Deci and Ryan (1985), proposed self-determination theory (SDT) trying to explain differences in human motivation.

3.3 Self-Determination Theory

SDT was formed on the premise that human behaviour is based on the gratification of the three basic psychological needs for competence, autonomy and relatedness (Ryan, 1995). As previously explained, intrinsically motivated actions are defined as self-determined whereas extrinsic motivated behaviours vary in their degree of self-determination, having either a relatively internal or external locus of causality. This locus of causality continuum -Perceived Locus of Causality Continuum (PLCC)- represents the degree to which the regulation of a non-intrinsically motivated behaviour has been internalised (Deci & Ryan, 1985; Deci & Ryan, 1991; Ryan & Connell, 1989).

Biddle, et al. (1999) investigated the prediction of physical activity intentions using goal orientations and self-determination theories in physical education. They found that perceived autonomy mediated the effects of goal orientations on intentions. Task orientation predicted intentions through intrinsic motivation and identification and ego orientation through perceived competence and the four types of behavioural regulation of *SDT*.

Experimental results (Ryan, 1982; Ryan, Mims & Koestner, 1983) support the link between internally informational aspects of the activity -reflecting intrinsic motivation- and task involvement. Nicholls (1989), supports the previous notion arguing that in situations where no evaluative cues are involved (no task irrelevant incentives or controlling physiological stress), all people tend to employ an

undifferentiated conception of ability (task orientation). As Whitehead and Corbin (1997, p.183) state: "...contexts that unconditionally support mastery and minimise external regulation and ego involvement are likely to lead to the development of a healthy sense of self and to encourage the most desirable types of motivation". In the same way, when self-improvement is fostered in a certain environment the task at hand becomes more controllable. Individuals feel more competent and more autonomous in relation to the given task and they are more likely to feel psychological growth (Ryan, 1995).

As Ryan (1995, p.405) argues: "Any intentional behavior can be classified in terms of the degree to which it is self-regulated versus regulated by forces outside the self...". In this way, the active and constructive nature of the internalization process of an activity is related either to a "true" or a "contingent" -false- self formation. Ryan and colleagues have done several studies exploring the effects of external versus internal regulation of behaviour to the self. When people's feelings of worth are depended upon specific outcomes -ego oriented- people are believed to have introjected certain values and regulations; their level of self-esteem depends on whether they satisfy these externally imposed regulations and they are relied on a contingent self-esteem (Deci and Flaste, 1995). True self-esteem on the other hand, involves the acceptance and personal valuing of an acquired regulation that mirrors an internal locus of causality (Ryan, 1995). This differentiation is important as self-esteem is an essential indicator of an individual's psychological well-being and one of the most important variables for an individual's mental health (Baumeister, 1993).

The social significance of the body has become increasingly important and the study of the physical self has gained in prominence. The relationship between physical self-worth and self-esteem has been in the region of $r = 0.6$, which is quite large given the number of non-physical attributes that contribute in the formation of self-esteem (Fox, 1997). In this way, examining the influential factors of physical self-worth is a step towards analysing one of the most important attributes of self-esteem formation.

The study of self-esteem has recently reached a second and more fruitful phase where several developments have taken place operationalising multidimensional models (Marsh, 1997). Physical self-perception instruments have been shown to be capable of describing, characterising and mapping groups and individuals (Fox, 1997; Fox & Corbin, 1989). Measures of the physical self (Fox, 1997; Marsh, 1997), have

been shown to be related to certain life adjustments people make (Egleston & Sonstroem, 1993; as cited in Sonstroem, 1997b), to future swimming performance (Sonstroem, Harlow, Salisbury, 1993), to exercise participation (Sonstroem, Speliotis, & Fava, 1992), and to one of the general components of global self-esteem (Harter, 1990; Sonstroem, 1997a).

The link between self-esteem and certain motivational constructs is important if we are to understand the climate that fosters exercise participation (Fox, 1997). According to Sonstroem and Morgan (1989), a behaviour is maintained in areas where people are likely to experience positive feelings of competence and self-esteem enhancement. Nevertheless, as people constantly evaluate their actions according to certain expectations and desires it is quite likely that they will enact in an activity because of a discrepancy between what they currently like and what they want to be (Biddle, 1997). Thus, the decision to initialise and maintain a behaviour (i.e., exercise behaviour) could be based on either positive or negative feelings of self-esteem. Nevertheless, as many studies have supported the positive relation of exercise and physical self-worth (Davis and Fox, 1993; Mutrie, 1997), for the purposes of this study it is assumed that an increased level of physical self-worth would lead to exercise participation.

In relation to the two motivational constructs already reviewed there are certain applications for the exercise domain. In environments where self-improvement is present the positive effects of task orientation could be lost when feedback towards an activity is given in a controlling way, that is by not providing choice and giving external pressures for self-improvement (i.e., "you should improve"), external pressures could obstruct the integration process, limit personal growth and true self-esteem formation.

In the same way, ego-oriented individuals who, according to achievement goal orientation theory, rely on normative feedback to prove their ability (Nicholls, 1989), might use more internalised reasons of exercise participation if they would be presented with feedback that facilitates integration (Deci and Flaste, 1995). This feedback would be: a) a meaningful rationale for the activity different than just the mere presentation of own ability, b) an acknowledgement of the conflict between the requested health behaviour and a behaviour that may be perceived as more pleasant

(i.e., watching T.V.), and c) minimisation of the pressure of doing the activity and providing choice for the task at hand (Deci, Eghrari, Patrick, & Leone, 1994).

As Ryan (1995), argues humans are intrinsically motivated to extend themselves into the world and to internalise what they experience. This internalisation depends on the support of the individuals' needs for autonomy, competence and relatedness. When one receives indigent support for autonomy and relatedness, s(he) will be expected to evidence more integrative difficulties in behaviours that require internalisation such as school, work, etc.

According to Ryan (1995), an intrinsically motivated behaviour is a spontaneous fully self-regulated behaviour and actions of this type are experienced as autonomous. In addition such unconflicted expressions of the self are accompanied by an internal locus of causality. Physical exercise can not be easily an intrinsically motivating behaviour although in some cases it is inherently satisfying. In cases where exercise is done for health or other reasons external to the self, exercise habits need to be internalised if we want this health-promoting response to last. Environmental cues will make the difference as to how this exercise behaviour will be internalised: Controlling cues that represent an internally controlling state will lead to guilt and anxiety that represent an introjected type of internalisation. On the other hand, if autonomous cues are applied exercise behaviour can become more accepted and personally valued and thus reflect an identified regulation of behaviour (Deci & Ryan, 1985; Ryan, 1995).

Looking at the previous findings one can understand the advantages of linking the theoretical constructs of self-determination, goal orientations and physical self-worth. What motivates people can have an effect on their behaviours, their feelings about themselves as well as their focus of reference.

The objectives of this study are:

- To shed more light on the links between task and ego goal orientations and physical self, as well as, the external and internal types of motivation with physical self,
- To understand better the theoretical premises linking the two types of goal orientations with certain types of the PLOC (i.e. self-improvement and internal types of motivation), and
- To find which is the best way to enhance the physical self of the exercisers in

applied exercise settings.

With all these previous notions in mind the hypothesis of this study is that task and ego orientations will be more related with the internal and external parts of the perceived locus of causality continuum, respectively. The intrinsic regulated domains of PLOC will mediate the effects of task orientation on physical self-worth. Finally, the extrinsic regulated domains of PLOC and ego orientation will not have any effect on physical self-worth.

3.4 Method

3.4.1 Participants

The sample comprised 350 exercisers (age mean = 30.8, SD= 9.17), living in Athens, Greece. They were engaged in one of four different types of exercise activities: Running (N=102), gym based fitness exercises (N=82), mini soccer (N=107) and basketball (N=59). Four different kinds of physical activities were sampled to enhance generalisability of findings.

3.4.2 Questionnaires

3.4.2.1 Task & Ego Orientation in Exercise Questionnaire (TEOSQ; Duda & Whitehead, 1998): All the 13 items of TEOSQ were modified in order to have meaning in the exercise context. The transformation was performed by four individuals with good knowledge of goal theory and both the English and Greek languages, and it was based mainly on changes in wording to reflect the meaning of the exercise context (e.g. "I am the only one who can do the exercises well and/or can lift more weights"). To test the possibility for the existence of other meanings of achievement in the exercise context, an additional item was placed related to appearance and reflecting the theoretical meaning of "ego orientation" ("I have the best appearance of all the other co-exercisers"). Exercisers were asked to respond in terms of, "when they are feeling most successful in the activity they choose" and they rated their responses on 5-point Likert scales. Each of the two factors reflecting "Task" and "Ego orientation" consisted of 7 items. Although the TEOSQ questionnaire has been used in many published studies, its exercise format (TEOEQ) was tested for the first time after a pilot study.

3.4.2.2 Physical Self Description Questionnaire (PSDQ; Marsh, Richards, Johnson, and Tremayne, 1994): Five of the 13 variables of the PSDQ questionnaire were used to make the questionnaire shorter, easier to use, and more applicable to the Greek population. The variables of sport competence, physical activity, strength, appearance and physical self-worth were used. These factors were chosen because they are closer to the exercise context in comparison to other more general ones (e.g. perceived health). Each variable contained 5 items. These 5 items were chosen based on the factor analysis of a pilot study that tested the applicability of the PSDQ questionnaire in the Greek population. Participants were asked to describe themselves and to respond on 6-point Likert scales (1-Absolutely wrong , 6- Absolutely right), as in the English edition of the questionnaire. Marsh et al. (1994) has provided evidence for the reliability and validity of these factors.

3.4.2.3 Sport Motivation Scale (SMS; Pelletier, Fortier, Vallerand, Tuson & Briere, 1995): Based on the SMS scale of Pelletier et al. (1995), an Exercise Motivation Scale was formulated. Four individuals with a good knowledge of *SDT* and the English and Greek languages translated the questionnaire with the exercise rather than the sport context in mind. Six variables were included (external regulation, introjected regulation, identified regulation, intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation to experience stimulation), each including 4 items. The variable of amotivation was not included due to its irrelevant meaning to the active exercise population. Individuals were asked, “why do you participate in this exercise programme?” and they rated their responses on 7-point Likert scales (1-not relevant, 7-totally relevant).

3.4.3 Procedure

At the beginning of their exercise activity or game, participants were asked to complete a survey containing questions concerning demographics and motives for participation. They were asked not to comment on the questions with their fellow exercisers. The whole procedure lasted 10 minutes.

3.5 Results

3.5.1 Psychometrics

The factor structures of all the questionnaires in use were confirmed through factor analysis. Psychometric details are included in Tables 3.1 to 3.3.

| ITEM | EGO | TASK |
|---|------|-------|
| "I am the only one who can do so well the exercisers and /or can lift most weights" | .726 | |
| "I can do better than most of the other exercisers" | .771 | |
| "Others make mistakes and I don't" | .748 | |
| "I have got the best appearance of all the other exercisers" | .766 | |
| "I am the exerciser with the best performance (e.g. I am the best in exercise performance)" | .819 | |
| "I am the best" | .834 | |
| "I learn something new and I want to exercise even more" | | .755 |
| "I learn something by trying really hard" | | .759 |
| "Great effort accompanies everything I do" | | .469 |
| "Something I learn makes me want to try more" | | .764 |
| "I learn something new and makes me feel really nice" | | .805 |
| "I try for the best I can " | | .642 |
| Eigenvalues | 3.70 | 2.99 |
| % of variance explained | 30.6 | 25.20 |

Table 3. 1 Psychometric properties of the TEOEQ questionnaire

| ITEM | Global Physical | Physical Strength | Physical Activity | Sport Competence | Physical Appearance |
|--|--------------------|----------------------|----------------------|---------------------|------------------------|
| "I am satisfied with the physical type I have" | .797 | | | | |
| "I am satisfied with my body" | .836 | | | | |
| "I feel good about my appearance and for what I can do physically" | .740 | | | | |
| "I feel good physically" | .777 | | | | |
| "I feel good for who I am physically" | .762 | | | | |
| "I am a physically strong person" | | .712 | | | |
| "I have got plenty of physical strength" | | .833 | | | |
| "I am stronger than most of the people my age" | | .658 | | | |
| "I would do well in a strength test" | | .821 | | | |
| "I am good at lifting heavy materials" | | .807 | | | |
| "Several times per week I exercise vigorously enough to breath hard" | | | .794 | | |
| "I often do exercises that make me breath hard" | | | .814 | | |
| "I exercise 3 or 4 times per week (or more) in intensity that makes me breath hard" | | | .840 | | |
| "Three times per week (or more) I do many physical activities (like jogging, swimming, etc)" | | | .648 | | |
| "I am going to the gym and/or I often practice other physical activities too" | | | .651 | | |
| "Other people believe that I am good at sports" | | | | .555 | |
| "I am good at most sports" | | | | .725 | |
| " I am attractive for my age" | | | | | .585 |
| "I have a nice looking face" | | | | | .787 |
| "I am ugly" | | | | | .705 |
| "I am good looking" | | | | | .721 |
| Eigenvalues | 6.98 | 2.56 | 1.98 | 1.47 | 1.27 |
| % of total variance | 18.09 | 17.10 | 13.01 | 12.12 | 7.72 |

Table 3.2 Psychometric properties of the PSDQ questionnaire adapted for the Greek population

| ITEM | Intrinsic Motivation | External Regul. | Introjected Regul. | Identified Regul. | Intrinsic (to Exp. Stimul.) | |
|---|-------------------------|--------------------|-----------------------|----------------------|--------------------------------|------|
| "For the pleasure I feel when I improve some of my weak points" | .652 | | | | | |
| "For the satisfaction I feel while perfecting my abilities" | .456 | | | | | |
| "For the pleasure I feel while executing difficult exercises" | .427 | | | | | |
| "For the pleasure I feel while learning exercises I 've never tried before" | .811 | | | | | |
| "Because I like to know new ways of improving my performance" | .702 | | | | | |
| "For the pleasure of discovering new exercises" | .685 | | | | | |
| "For the pleasure of improving in some difficult exercises" | .547 | | | | | |
| "Because I am well regarded by the people I know" | | .791 | | | | |
| "For the prestige and social acceptance of being a sportsman/sportswoman" | | .706 | | | | |
| "Because people around me think it is important to be in shape" | | .784 | | | | |
| "Because I show others my abilities" | | .606 | | | | |
| "Because you have to exercise if you want to be in shape" | | | .674 | | | |
| "Because I have to exercise to feel good" | | | .803 | | | |
| "Because I would feel guilty if I didn't give of my time to do this activity programme" | | | .627 | | | |
| "Because I have to exercise regularly" | | | .785 | | | |
| "Because it is one of the best ways I know to develop other aspects of myself" | | | | .782 | | |
| "Because it is one of the best ways to maintain good relationships with my friends" | | | | .730 | | |
| "Because it is one of the best ways I have chosen to meet other people" | | | | .774 | | |
| "For the excitement I feel when I am really involved in the activity" | | | | | .492 | |
| "Because I like the feeling of being totally immersed in the activity" | | | | | .497 | |
| "For the pleasure I feel in living exciting experiences" | | | | | | .839 |
| "For the intense emotions I feel while I am doing a sport that I like" | | | | | .469 | .537 |
| "For the pleasure it gives me to know more about the exercise type I like" | | | | | | .714 |
| Eigenvalues | 8.004 | 2.96 | 1.73 | 1.15 | 1.05 | 1.00 |
| % of variance explained | 33.34 | 12.33 | 7.23 | 4.82 | 4.38 | 4.18 |

Table 3.3 Psychometric properties of the Sport Motivation Scale adapted for Greek exercisers

3.5.2 Reliability and Descriptive Statistics

As can be seen from Table 3.4 all the examined variables showed acceptable Cronbach's alphas ranging from .88 to .71. Means and standard deviations of the variables are provided in Table 3.4. Scores suggested that participants scored higher in introjection, identified and intrinsic types of behavioural regulation as well as, on physical self-worth measurement. Finally, task orientation rates were higher than ego orientation scores.

| | N | Mean | Std. Dev. | Cronbach's Alpha |
|----------|-----|--------|-----------|------------------|
| EXTRINSI | 305 | 3.4902 | 1.4788 | .79 |
| INTROJ | 306 | 5.2328 | 1.2074 | .76 |
| IDENTIF | 306 | 5.2168 | 1.1243 | .71 |
| INTRINSC | 307 | 4.9980 | 1.2546 | .84 |
| PHYSSELF | 329 | 4.5234 | 1.0040 | .88 |
| TASK | 336 | 4.1047 | .7254 | .79 |
| EGO | 336 | 2.1860 | .9969 | .87 |

Table 3.4 Descriptive statistics and alphas of the variables in focus

3.5.3 Correlation Matrix

The correlation matrix of the examined variables is presented in Table 3.5. The variables of the self-determination continuum were correlated with each other. The correlation was higher between the variables that are closer in the continuum (e.g. identified regulation and intrinsic motivation) and weaker among the more distant variables of the continuum. A rather unexpected finding was the one displayed between intrinsic motivation and external regulation as they were highly correlated at the level of .32. This finding could be attributed primarily to the scale's inability to measure adequately intrinsic motivation as several items that could foster the intrinsic nature of the activities were excluded (i.e. "for the pleasure I feel in living exciting

experiences"). Additionally as the regulation of the exercise behaviour for the physical activities in focus was not measured before, the previous finding could be attributed to the very nature of the activities.

Task orientation was unrelated to ego orientation, consistent to the theory. Further, task orientation was highly correlated with all the variables of self-regulation continuum. Nevertheless, its correlation with the PLCC continuum reached the level of .5 only with the identified regulation and the intrinsic motivation. On the other hand, ego orientation was highly correlated only with extrinsic regulation.

| | EXTRINSI | INTROJ | IDENTIF | INTRINSC | PHYSSELF | TASK | EGO |
|---|----------|--------|---------|----------|----------|-------|-------|
| EXTRINSI | 1.000 | | | | | | |
| INTROJ | .307** | 1.000 | | | | | |
| IDENTIF | .209** | .478** | 1.000 | | | | |
| INTRINSC | .325** | .498** | .628** | 1.000 | | | |
| PHYSSELF | .107 | .298** | .344** | .397** | 1.000 | | |
| TASK | .144* | .328** | .524** | .542** | .214** | 1.000 | |
| EGO | .481** | .114* | .107 | .153** | .048 | -.033 | 1.000 |
| ** Correlation is significant at the 0.01 level (2-tailed). | | | | | | | |
| * Correlation is significant at the 0.05 level (2-tailed). | | | | | | | |

Table 3.5 Correlation matrix of the variables in focus

3.5.4 Path Analyses

The structural relationships between goal orientations, behavioural regulations and physical self-worth were calculated through factor analysis using EQS (Bentler, 1995). The hypothesised model (Figure 3.1) was confirmed by the final model (Figure 3.2). The fit was good ($\chi^2 = 9.302$ (3DF), Bendler-Bonett Fit Index = .983, CFI = .988, LISREL GFI = .991, SRMR = .037. According to the final model the variables of the self-regulation continuum modify the effect of ego orientation to physical self-worth. In the same way, the variables of self-regulation continuum (except external regulation), modify the relationship of task orientation and physical self-worth. Both goal orientations predict physical self-worth through intrinsic and identified regulations, and to a lesser degree through introjected regulation. Thus, mainly self-determined forms of regulation predict physical self-worth. The model predicted 17.2% of the variance in physical self-worth.

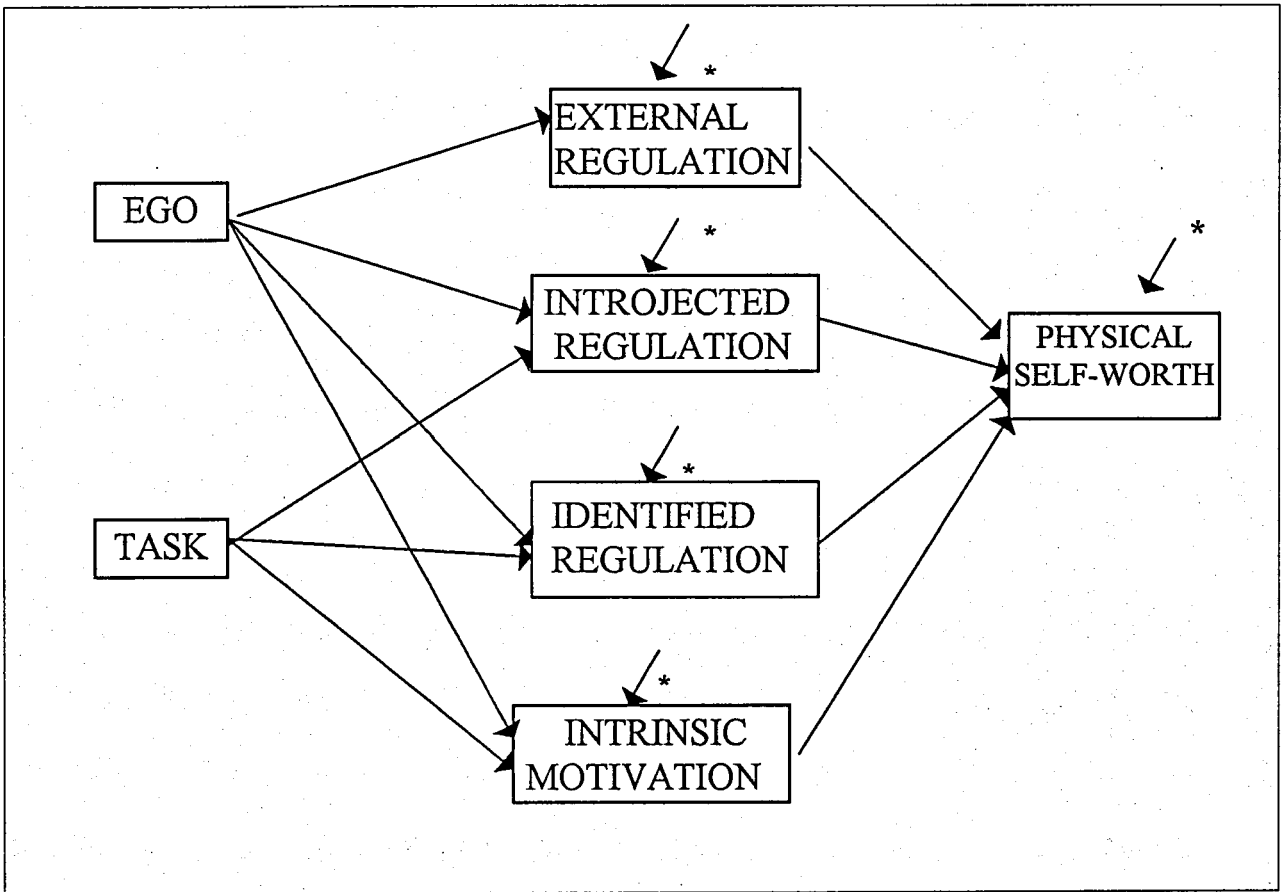


Figure 3.1 Hypothesised model among the examined variables.

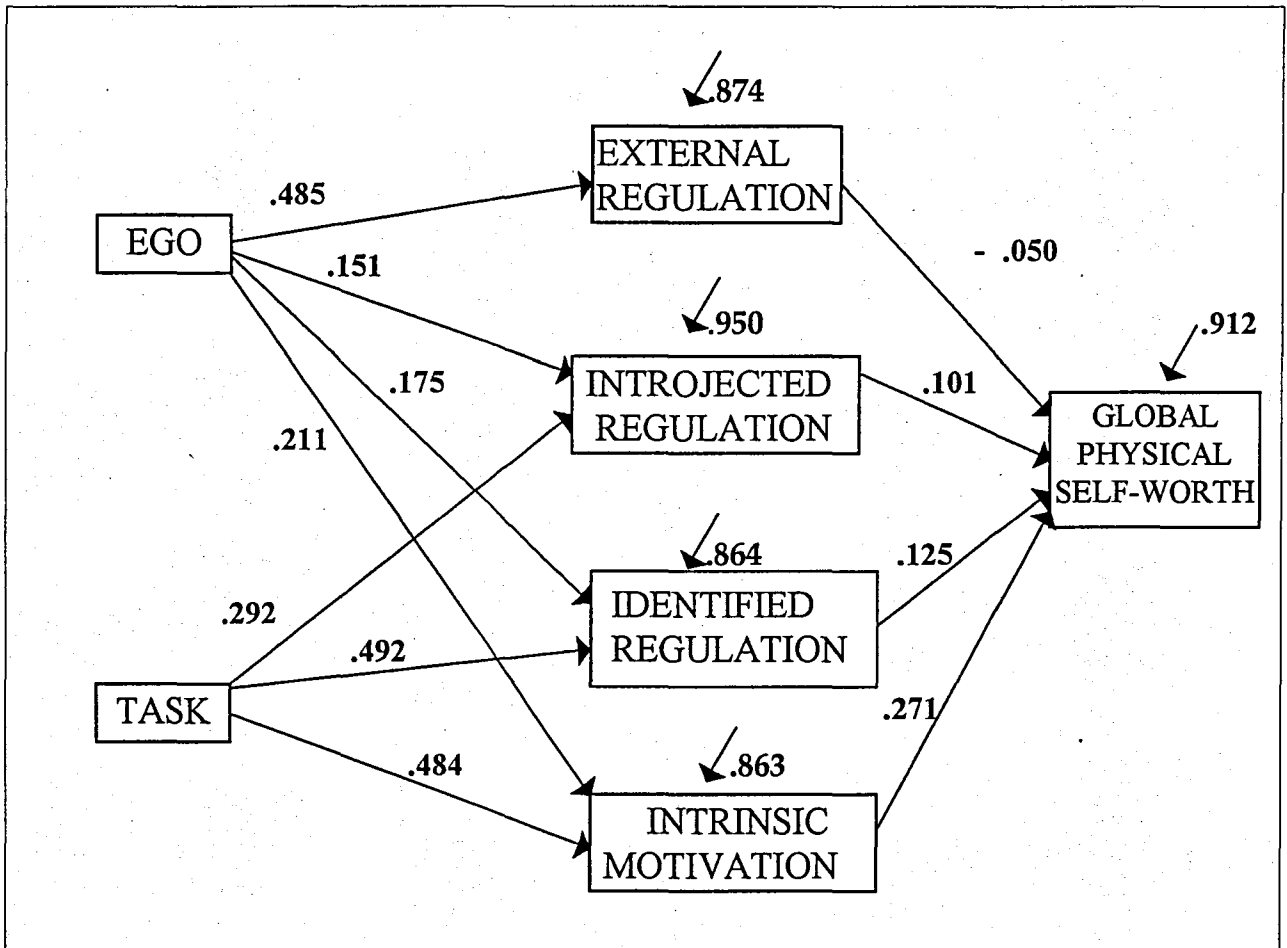


Figure 3.2 Final model among the examined variables.

3.6 Discussion

This study analysed two currently popular motivational theories in sport and exercise psychology -goal orientations and self-determination theories- in predicting physical self-worth. Greek exercisers participating in competitive (i.e. mini football and basketball as recreational activities), and non-competitive (i.e. gym participants) types of exercise activities took part in this study. All the subjects were actively participating in at least one (out of four) type of exercise.

The hypotheses of this study were confirmed as the relationship between goal orientations and physical self worth was mediated by the self-regulation continuum variables. More precisely, all domains of perceived locus of causality are related to task and ego orientations, (except the relation of task orientation and extrinsic motivation), and these domains act as mediators of the relationship between goal orientation and physical self-worth. In accordance with SDT (Deci and Ryan, 1985), only the internalised forms of regulation strongly influence physical self-worth, and the relation gets weaker as behaviour becomes more extrinsically oriented.

Even though 17.2% of the variance of physical self-worth was predicted it could be argued that this ratio is acceptable given the fact that physical self-worth is a rather global construct and that the extracted model was based only on motivational variables in exercise. Personal attributes (i.e., perceived competence, perceived importance, etc.) could possibly add to the explained variance of PSW. Further, according to both the examined theories perceived environmental cues can have strong effects on self-esteem formation (Fox, 1997). Models predicting physical self-worth could contemplate these suggestions in the future.

According to Deci and Flaste (1995), when people's self-worth is based on certain outcomes, they gradually become highly rigid with themselves in order to appear in accordance to others' aspirations. This progressively leads to the adaptation of a contingent self that develops based on external criteria. Unless one becomes more autonomous by using internal criteria of success, can become self-motivated and reach a true sense of self-worth. The results of this study support the proposals of Ryan and colleagues (see review); In order to influence the formation of a true physical self-worth we need to support an internal regulation of behaviour and a behaviour based on self-referenced criteria of success -task oriented- can facilitate this process. This theoretical notion is in line with the findings of Kavussanu and Harnish (2000), where only high task orientation was related to children's increased sense of self-esteem regardless of the level of perceived ability.

As Ryan and Deci (2000) propose, certain environmental factors influence the process of self-regulation of behaviour. In this way, environment cues influence the goals of an activity in order for the activity to be internalised and result in the advancement of physical self-worth. If we take account of the convictions of humanistic psychology expressed by Carl Rogers (1963), individuals strive to

actualise their potential and this “directional tendency” (p. 6) needs certain motivating conditions for maintenance and enhancement. What Rogers (1963) expressed as the important “psychological climate” (p.9), that can be the source of developmental change in any individual, was described by Ryan (1995) as the environmental conditions that nurture and support every behavioural effort for integration. The needs for autonomy, competence and relatedness are inherently preferred and are essential elements to any individual’s growth and integrity (Ryan, 1995).

Although Nicholls (1989) described goal orientation theory and provided evidence about the motivational consequences of the two different conceptions of ability, he did not provide any suggestions about the fulfilment of the need for competence and the consequent enhancement of self-esteem. *SDT* (Deci and Ryan, 1985;1991; Ryan and Deci, 2000), provides the rationale for self-esteem enhancement through the human need for autonomy. More precisely, utilising the variables of this study, if controlling cues are applied (i.e. lack of choice) in the case of a task or an ego oriented individual, introjection of the behaviour is likely to occur and this can result in an internally controlling state and behaviour avoidance. Conversely, if an ego or a task oriented individual receives the environmental conditions that facilitate integration of a certain behaviour, the behaviour can be self-regulated and attractive through personal valuing, acceptance and identification (Deci et al., 1994). This identification process leads to a true sense of self (Deci and Ryan, 1985), and consequently to the part of the self related to the identified behaviour (i.e., physical self). In this way, the self-regulation continuum displays the type of environmental effects on the achievement goals pursued by the individual.

Perceived competence was not put as a separate mediating variable in the hypothesised model. Testing the model on two different samples based on their level of perceived sport competence did not change the extracted model. In Biddle et al. (1999), when ego orientation was mediated by perceived competence, it was related with the more intrinsically forms of self-determination in order to predict exercise intentions. Future usage of perceived competence as a separate mediating factor between ego orientation and self-determination continuum could lead to more fruitful results.

Task orientation was not related to extrinsic motivation in accordance with the hypothesis of the study. It seems that in the presence of controlling feedback task

oriented individuals do not adopt an extrinsic regulation of performance but rather an introjected one. Thus, self-referenced sense of ability in conditions of restricted autonomy may lead to increased feelings of guilt and anxiety leading to the motivational pattern of the ego oriented individuals (Ryan and Deci, 2000).

Many studies have supported the connection of body satisfaction and physical self-worth with exercise participation (Davis and Fox, 1993; Mutrie and Davison, 1994; Tucker and Maxwell, 1992). Although the causal relationship of exercise on physical self-worth (and vice-versa) has not been established yet, future studies need to shed more light in this relationship as both high and low levels of physical self-worth may lead equally to exercise participation (Biddle, 1997; see review). The examination of this causal relationship remains to be seen and it is of vital importance for successful future exercise promotion plans as both exercise participation and self-esteem are important aspects of quality of life (Mutrie, 1997).

Results clearly call for replication ideally in a cross-cultural context in order to retest the previously discussed behavioural phenomena and to avoid cultural bias. Further, experimentally manipulated feedback can give much vital information as to which conditions are more important towards the integration of exercise behaviour that can lead to elevated physical self-worth and better exercise adherence.

4. Study 2: Behavioural Counselling in Obesity: Case Studies Using the Stages of Change and Self-determination Theory

4.1 Introduction

With the help of two theories dealing with the need for *autonomy* and *competence*, we explored the mechanism of influencing physical self-worth in the exercise context. Deci and Ryan (1985) provided an explanation of the interaction between the two motivational constructs:

"Competence is the accumulated result of one's interactions with the environment, of one's exploration, learning and adaptation. (...) Competence refers to the capacity for effective interactions with the environment that ensure the organism's maintenance" (Deci and Ryan, 1985; p.27).

Even though the need for competence provides the energy for learning, the experiential aim is the feeling of competence that results from effective action. In other words, the inherent feeling of competence that results from effective functioning seems to result only in the conditions of continual stretching of one's capacities, otherwise boredom soon sets in (White, 1959). The importance of personal choice has been emphasised repetitively with the use of various terms and definitions (deCharms, 1968). *Autonomous* or *self-determined* behaviour refers to the experience of freedom in initiating one's behaviour (Deci, 1980).

The interrelation of the two needs for *competence* and *autonomy* can be conceptualised as the need for "*self-determined competence*" (Deci & Ryan, 1985; p.32). The intrinsic needs for *competence* and *self-determination* keep individuals involved in ongoing processes, seeking and attempting to conquer optimal challenges. These challenges are suited to people's competencies, while people are in conditions that foster personal causation (Deci & Ryan, 1991).

It appears that in the exercise context, environmental conditions which foster self-regulated behaviours are the ones that can satisfy competence, helping to advance physical self-worth. *Self-determination* seems to be more holistic as it displays the type of environmental effects on the achievement goals pursued by the individual.

Confirming the results of the previous study in a practical setting, while using a different methodology, is one way forward. Conducting an experiment to examine if the motivational climate of an autonomous environment has an impact on the global and physical self-esteem of the participants, could provide important information as to 'how and why' autonomy has the potential to influence human behaviour.

Obesity is one of the most challenging settings for testing the efficacy of autonomy in influencing various psychological constructs. Counselling obese and overweight individuals is a challenging task because food relates to one of the most central of human behaviours (i.e., eating), learnt at a very young age when humans have no personal control over the amount and quality of food intake (Flynn, Goldberg, Prentice, & Cole, 1999).

Further, an effective behaviour change requires changes in both energy intake (eating patterns) and energy expenditure (exercise behaviour) (Prentice, 1999). Providing the support and counselling for exercise initiation and maintenance is another critical point. Finally, as the levels of self-esteem and physical self-worth are both under strain in obese individuals (Wardle, 1999), motivation plays a central role in weight management.

The need for a theoretical basis in the counselling sessions will be tackled with the use of the *Transtheoretical Model (TTM)* of behaviour change (Prochaska, Norcross, & DiClemente, 1994). The *TTM* elucidates five distinct stages that individuals are held to progress/relapse through while attempting to reach a particular health goal. From *precontemplation*, which is the first stage, to *maintenance*, which is the fifth stage, individuals are possibly progressing, relapsing, remaining or even skipping several stages. The *TTM* has been successfully employed in many health behaviours and its utility has been supported by a number of reviews (Armitage & Conner, 2000; Sutton, 2000).

Consequently, the aim of this study is the investigation of the effects of a counselling programme on self-esteem ratings, exercise behaviour, and adaptive eating patterns using behavioural techniques through the application of the *Transtheoretical Model* (Prochaska, Norcross, & DiClemente, 1994).

As the prevalence of overweight and obesity has been dramatically increased during the 20th century all the indications are that the problem will get even worse in the coming decades (Bouchard & Bray, 1996). Obesity is a major public health concern as it is associated with numerous medical complications that lead to morbidity and mortality (Pi-Sunyer, 1995). During the last thirty years many behavioural techniques have been proposed as the most appropriate psychological treatment to deal with obesity and its effects (Jordan, 1984). Nowadays, behavioural treatment of obesity has as a primary goal to modify eating habits and levels of physical activity. Its goal is to produce a negative energy balance resulting in weight loss (Wilson, 1995). Increased physical activity is strongly associated with long-term maintenance of weight loss, and this is explained both physiologically and psychologically (Brownell, 1995b; Fox, 1997). Further, physical activity is of particular importance as regular exercise can reduce the risk of many medical problems associated with obesity (Barlow, Kohl, Gibbons, & Blair, 1995; Wadden, Vogt, Foster, & Anderson, 1998).

Culture is a powerful factor in how people react to body weight because it sets the context for eating and physical activity levels and also allocates moral and social meanings to weight (Sobal, 1995). Nowadays, thinness symbolises competence, success and sexual attractiveness, while obesity represents laziness, ugliness and lack of willpower (Wilfley & Rodin, 1995). This discrepancy of ideal versus real body weight plays an important role in body image and self-esteem: Perceived unattractiveness can lead to low levels of self-esteem and other impairments because the body and its appearance have become a point of social interaction, sexuality, functionality and health (Fox, 1997).

4.2 Body Image

Recent studies have shown high levels of body image dissatisfaction in obese persons (Brodie & Slade, 1988; Cash, Winstead, & Janda, 1986; Foster, Wadden, & Vogt, 1997). Reports have shown that up to 79% of overweight women have negative body images (Cash, et al., 1986). Sarwer, Wadden and Foster (1998) claimed that body image concerns can seriously affect the quality of peoples' lives and they proposed the potential need for a separate diagnostic category for individuals with increased distress with a quantifiable aesthetic problem in the diagnostic manual of the

American Psychiatric Association. Further, Sarwer et al. (1998) claimed that the severity of body image dissatisfaction in obese people may be affected by factors other than weight and they emphasised the importance of studies that deal with body image improvements in order to guide future clinical interventions.

There are numerous reports associating body dissatisfaction with food restriction and psychological disorders such as anorexia and bulimia nervosa (Davis, 1997). In this way, the physical self and its association with self-esteem could be introduced and serve as a cornerstone in the development of higher self acceptance and long term weight maintenance, in interventions concerning obese people.

Social Physique Anxiety (SPA) was conceptualised as the dispositional tendency to become apprehensive about having one's body evaluated in real or imagined social settings (Hart, Leary & Rejeski, 1989; Treasure, Lox, & Lauton, 1998). Previous studies based on non-obese (Hart, et al., 1989), obese (Treasure, et al., 1998), and overweight (Bain, Wilson, & Chaikind, 1989) populations have shown that individuals reporting high SPA are related to frequent negative thoughts about their body appearance, and to reduced rates of exercise participation in public places. As SPA is related both to body image and exercise participation, it was chosen as an important variable in the current study.

Intervention programmes need to provide the conditions for the individual's growth and integrity. According to Rogers (1963), the conditions that facilitate personal potential and growth are connected with the client's sense of autonomy and the psychological climate created by the counsellor. In the same way, high levels of self-esteem are associated with an autonomous orientation and self-determined functioning (Deci & Flaste, 1995). Deci and Ryan (1985), based on the human need for autonomy and self-determined actions, proposed self-determination theory (SDT) as an important theoretical framework for understanding human motivation.

4.3 Self Determination Theory

Deci and Ryan (1985) suggest that the functional aspects of an event can either undermine or enhance an intrinsically motivated behaviour. The functional aspects of an event can be either controlling or informational in nature, depending on the feedback received. A highly controlling event can influence the feelings of self-determination and as a result can reduce intrinsic motivation. On the other hand, an event that is

informational in character, can enhance the feelings of self-determination and further promote more autonomous motives (e.g., enjoyment).

Weight loss and lasting behavioural change, according to *SDT*, depends on accepting the regulation of behaviour as one's own. On the contrary, if the reasons for dieting are external to one's self, one is not likely to personally endorse the required behaviour that will lead to successful weight loss (Deci & Ryan, 1985).

Williams, Grow, Freedman, Ryan and Deci (1996) found support for the application of *SDT* to the problem of weight loss and maintenance. They indicated that individuals who were more autonomous were more successful in a six month low-calorie diet programme and maintained more of their weight loss in a two-year follow-up. In other words, autonomous motivation based on both individuals' autonomous orientation and autonomy supporting environment was found related to: a) Adherence in the weight loss programme, b) losing weight during the programme, and c) maintenance of the lowered weight.

As many researchers have argued (Fox, 1992; Weiss, 1987; Whitehead & Corbin, 1997), an emphasis on the promotion of intrinsic fun and excitement can assist the longevity of physical activity participation. Perceived choice to participate in different types, intensities and time periods of physical activity can promote health and wellness. In the same way, many have argued for the importance of *SDT* in explaining exercise and health behaviour (Deci, 1995; Deci & Ryan, 1985; 1991).

As previously stated, promoting physical activity has a significant role to play in both the prevention and management of overweight and obesity towards the battle against morbidity and mortality. Further, because obese people are less active and less likely to take opportunities to be active (Bain, Wilson & Chaikand, 1989), they are a high priority group for exercise promotion programmes (Biddle & Fox, 1998).

4.4 Stages of Change

As Biddle and Fox (1998, p.39) state "Regrettably, research into the motivational determinants of physical activity in overweight or obese adults is sparse." The same authors propose a framework of exercise promotion based on the Transtheoretical Model (TTM) of behaviour change (Prochaska & DiClemente, 1983). TTM has been proposed as a successful model of changing addictive behaviour in psychotherapy (Miller & Rollnick, 1991), but has since been proposed as a framework

of understanding readiness to begin physical activity, too (Marcus & Simkin, 1994). Three factors have been proposed to influence the change process within the TTM: A. The individuals' self-efficacy for change, B. The decision balance of the advantages and disadvantages of change and C. The Stages of Change (SOC) individuals use in order to modify their behaviours. The results of a recent meta-analysis gave support to the application of TTM in the exercise setting as it confirmed that being in a certain stage is associated with a different level of physical activity, self-efficacy, pros and cons, and process of change (Marshall & Biddle, 2001).

The five stages according to Prochaska and Diclemente (1983), are precontemplation, contemplation, preparation, action, and maintenance. Each of these stages is related to certain thoughts, feelings, behaviours and processes of change (Table 4.1).

| Stage of Change | Behavioural Level of Change | Cognitive Level of Change | Process |
|-------------------------|--|---|--|
| Precontemplation | No behavioural change | Unaware of the problem / No intention to change | Experiential Process |
| Contemplation | No behavioural change | Willing to change / Fear of change and new self | Experiential Process |
| Preparation | Small changes in behaviour | Understanding change potential / Prioritising change | Experiential (and Behavioural) Process |
| Action | Behavioural change but <u>less</u> than 6 months | Re-evaluating and re-organising the environment to match change | Behavioural (and Experiential) Process |
| Maintenance | Behavioural change <u>more</u> than 6 months | Securing change: environment control and relapse prevention | Behavioural Process |

Table 4.1 Processes, behavioural and cognitive characteristics according to Stages of Change of the Transtheoretical Model of behavioural change (Prochaska & DiClemente, 1983)

As researchers argue about the need for studies dealing with the movement of obese or overweight through the SOC (Biddle & Fox, 1998), and with relatively few published studies on SOC and exercise behaviour, there is a clear need for studies dealing with both SOC and exercise behaviour.

Mullan and Markland (1997) explored the relationship between *SDT* and stages of change for exercise behaviour. They found that those in the action and maintenance stages were more self-determined in their reasons for exercising than those in the

preliminary stages of exercise behaviour. They recommended that less pressure and control over an individual could lead to self-regulation of exercise behaviour and longevity of exercise adherence.

As Miller and Rollnick (1991) and Prochaska, Norcross, and DiClemente (1994) suggest, attempts to apply SOC in counselling or therapeutic sessions should follow key basic principles. Starting with the *precontemplation* stage, the counsellor should attempt to increase the client's perception of risks and problems with the current behaviour. In the *contemplation* stage, the counsellor should evoke reasons to change, analyse the risks for not changing and strengthen the individual's self-efficacy for changing his/her current behaviour. In the *preparation* stage, the counsellor should help the individual to commit himself (herself) to behavioural change. In the *action* stage the individual needs to seek help in order to take the right steps toward change. Finally, in the *maintenance* stage, the aim is to familiarise the person with strategies to prevent relapse. The individual should accrue the resources to renew the processes of contemplation, preparation, and action without getting demoralised due to relapse to unhealthy habits.

4.5 Aim of the study

Having these notions in mind and taking into consideration the need for further improvement in the application of behavioural treatments in obesity (Foreyt & Poston, 1998), a counselling intervention was designed in order to test the application of SOC on an exercise promotion programme aimed to influence exercise and eating behaviours in overweight and obese individuals. The objectives of this study were:

- To examine the effects of a controlling versus an autonomous counselling feedback on exercise behaviour and various psychological factors,
- To assess the impact of a treatment having an educational content without the application of any cognitive-behavioural technique,
- To explore the changing patterns of global and physical self ratings in all the examined conditions,
- To improve exercise participation in all the individuals participating in the study,
- To assess the ability of the TTM and SOC to serve as a theoretical framework in the counselling procedure,
- To facilitate diet treatment effects, as all participants in this study were regulating

their body weight under the guidance of a single dietician.

In order to assess the potential changes of the interventions a single subject design was employed (McLeod, 1994) with four conditions: A. An autonomous condition, with an emphasis on environmental cues supporting personal choice, B. A non self-determined condition, with emphasis on the restriction of personal choice, C. An education condition with information related to caloric intake and expenditure, and D. A control condition that did not have any intervention or connection with the counsellor.

It was hypothesised that the individual who received the autonomous counselling would demonstrate the most adaptive patterns of behaviour change. Conversely, lack of autonomy would lead to the least adaptive behaviour change. The education condition would show only changes attributable to information related to a healthy way of life. The control condition would not show any behaviour change attributable to the intervention. Self-ratings were predicted to follow the same patterns with the most adaptive change demonstrated by the autonomy supportive environment.

4.6 Method

An ABA time series single case experimental design (Kratochwill, 1978) was employed for an exercise and a diet programme, using behavioural techniques (5, *see Appendix*), in order to understand the potential facilitating effects of an autonomous versus a non self-determined environment. Participants were either overweight or obese women participating in a programme of food regulation.

4.6.1 Questionnaires

Forty overweight and/or obese women already participating in a programme of food regulation in a middle-class diet centre in Athens, Greece, were selected based on their willingness to participate in a counselling treatment. They completed:

4.6.1.1 The *Exercise Questionnaire* (Marcus, Selby, Niaura & Rossi, 1992). The questionnaire comprises of 6 statements (e.g. "I currently do not exercise, but I am thinking about starting to exercise in the next six months") that places each individual in a stage according to the Stages of Change (Prochaska, Norcross, & DiClemente, 1994). Marcus et al.(1992), provide details on the psychometric properties of the Exercise questionnaire.

4.6.1.2 The *Social Physique Anxiety Scale* (Petrie, Diehl, Rogers & Johnson, 1996).

Social physique anxiety (SPA) was chosen as it has been proposed from previous studies that overweight people experience lower levels of body image, elevated levels of body-related anxiety and reduced levels of exercise adherence in public locations (Treasure, Lox, & Lawton, 1998). A Greek version of the 12-item SPA questionnaire was used (e.g. "I would worry about wearing clothes that might make me look too thin or overweight") (α : .79). Petrie et al. (1996) provide information on the psychometric properties of SPA scale. For the needs of the study SPA was assessed as a uni-dimensional measure and all items were positive in meaning following the suggestions of Treasure et al. (1998). All items were rated on a 5-point Likert scale ranging from 1 ("not at all") to 5 ("extremely") with SPA scores ranging from 12 to 60.

4.6.1.3 A short version of the *Physical Self-Description Questionnaire* (PSDQ, Marsh, Richards, Johnson, & Tremayne, 1994) was used especially adapted for the Greek population (Georgiadis & Biddle, 1998). Five of the 11 subscales of the PSDQ were used to shorten the scale and focus on only constructs of interest. The constructs of sport competence (α =.92), physical activity (α =.80), strength (α =.90), appearance (α =.84) and physical self-worth (α =.93) were used. Each subscale contained 5 items chosen from a factor analysis of pilot data with a Greek sample. Participants were asked to describe themselves responding on a 6-point Likert scale (1-Absolutely wrong, 6- Absolutely right), as in the English version of the questionnaire. Marsh et al. (1994) provided evidence for the reliability and validity of these factors.

4.6.1.4 *Rosenberg's Self-esteem Scale* (Rosenberg, 1965), assesses a uni-dimensional global self-esteem. It was chosen for this study as a valid and short assessment of self-esteem. Each item is assessed on a 4-point Likert scale (1-strongly disagree to 4-strongly agree). Factor analysis and internal reliability tests reveal acceptable psychometric properties (α =.77) and Rosenberg (1965) provided evidence for the reliability and validity of these factors.

4.6.1.5 The *Minnesota Multiphasic Personality Inventory* (MMPI) (Hathaway & McKinley, 1940). The MMPI was used to screen for individuals with psychological disorders such as bulimia nervosa, that could affect the counselling procedure and conclusions of the study. A person taking the MMPI responds to 550 statements according to one of the two categories: "true" and "false".

MMPI scores for all individuals were normal and according to the criteria used to assess abnormal behaviour (Galdwell & O'Hare, 1975). Thus all the participants had valid scores ($F < 16$, $F-K < 11$, $30 < T\text{-score} < 70$, and $GI < 60$) in order to participate effectively in a non-clinical counselling treatment.

4.6.2 Procedure

Four women were chosen based on their MMPI results and their readiness to change exercise behaviour (through the Stages of Change for exercise questionnaire). After checking that they were free from any psychological disorder, according to MMPI, and they were all pre-contemplators regarding exercise (according to SOC), they were randomly assigned to one of four different experimental conditions.

The four individuals were chosen to participate in a 12-week intervention programme designed to promote physical activity, facilitate the physiological effects of the diet treatment and improve self-esteem and physical self-perceptions. They completed questionnaires before the first meeting, and after the first, second, and third month of the treatment. The four conditions that were employed were: An "autonomy" condition, a "non self-determined" condition, an "education" condition, and a "control" condition. All individuals were attending a diet treatment with the same dietician. In more detail:

The Autonomy condition emphasises personal decision making of the individual during treatment. Based on SDT (Deci & Ryan, 1985), it views humans as proactive organisms whose intrinsic functioning can be either facilitated or thwarted by the social environment. Thus, extrinsic behaviours to the self (such as dieting and exercise to lose weight) can be either integrated or introjected (Deci, Eghrari, Patrick, & Leone, 1994). An autonomous environment provides choice, furnishes a meaningful rationale and acknowledges the individual's perspective (Deci, et al., 1994). Allowing choice means giving the individual who will carry out the decision a chance to participate in making that decision, minimising the external pressure to follow the required behaviour. Table 4.2 provides details on the type of feedback the autonomy condition received during the treatment.

| AUTONOMY | NON SELF-DETERMINED |
|--|---|
| <p>It's important for you to control the situation</p> <p>You control the situation</p> <p>It is important to consciously understand your actions</p> | <p>The situation must be controlled</p> <p>The situation must change</p> <p>You must control your weight problem</p> <p>You have to consciously understand your actions</p> <p>You ought to understand your self better</p> <p>The situation must be controlled</p> <p>The situation must change</p> <p>You must control your weight problem</p> <p>You have to consciously understand your actions</p> <p>You ought to understand your self better</p> |
| <p>You direct the course of the programme</p> <p>You decide where we go - where it is going to lead you</p> | <p>You have to understand where the right and wrong movement is going to lead you</p> <p>You must understand your behaviour</p> |
| <p>It is important in order for you to be able to take the condition in your hands</p> <p>You are able and you can declare it through your actions</p> <p>You can make it in this counselling programme</p> <p>The best YOU can do is enough in order to be successful (enhancing perceived ability)</p> | <p>You must confront the situation without any evasion</p> <p>You must prove your ability through your actions</p> <p>You have to impel and prove your ability to yourself and to the people around you</p> <p>You have to succeed for yourself</p> |
| <p>I can understand how tempting these foods are for you (understanding emotions)</p> <p>I can understand the relaxation and enjoyment these moments yield ...</p> <p>The reason you follow this programme is for you to be able to find again your competence without any limitations in your aesthetics, and your physiological and psychological health (logical explanation)</p> | <p>This intense food attraction can be, and must be, changed</p> <p>These moments must be full with something more fulfilling for you: If you do these activities you will be able to... (conditions)</p> <p>If you want to change yourself you must try to do what we have agreed (lack of logical explanation)</p> |
| <p>I believe that when you are aware about your actions you will not continue this kind of behaviour that might cause you in the future many health problems and it is not the best model of behaviour for the people in your environment (clear stated results of action and behaviour limits)</p> | <p>You must be aware of the consequences of your behaviour, as well as, the possible health problems you may have in the future...</p> |
| <p>This behavioural change requires rationalisation and willpower. It is important for you to change behaviour but it is also important to understand that the effort is from you to you with the counsellor and the people of your environment aiding your effort (information and autonomy)</p> | <p>You have to change your behaviour and you must put every effort for your own good and for the good of the people next to you</p> |

Table 4.2 Autonomy vs. non self-determined condition directions received during the treatment

The non self-determined condition provided lack of choice and logical explanations, conditions of success, and a firm telling of what to do and what not to do (see Deci & Flaste, 1995). Table 4.2 gives details of the feedback received by the individual in the non self-determined condition. Behavioural techniques were applied in the same way as in the autonomy condition.

The Education condition received information regarding the definition and the measurement of obesity as well as the causes and the health implications of obesity (Mortoglou, 1996). All directions were given in a non-directive way. The individual in the Control condition attended the diet treatment but did not have any counselling session with the counsellor.

Dependent variables: Repeated measurement were used throughout the duration of the study. All dependent variables were examined in:

Pre-assessment where the individuals completed the MMPI questionnaire, Stage of Behaviour Change, Rosenberg's Self-esteem scale, Physical Self-esteem Ratings using the PSDQ, and the Social Physique Anxiety questionnaires.

In the 1st week of the treatment: Self-esteem, PSDQ, SPA, body weight and self-reported exercise behaviour.

Weekly assessment: Body weight and exercise behaviour.

Monthly assessment: Self-esteem, PSDQ, SPA, exercise behaviour and percentage of body fat.

After-treatment assessment, 1 month and 5 months after the termination of the treatment: The same variables that were examined in the pre-assessment phase were examined after the termination of the intervention treatment (except the MMPI questionnaire and the stage of behaviour change).

4.6.3 Internal External and Procedural Validity

Internal validity is enhanced because the baseline condition is included as one of the conditions for comparison (Hrycaiko & Martin, 1996). *External validity* was enhanced with the use of the MMPI questionnaire. In this way, none of the individuals participating in the treatment showed any tendency for a psychological disorder. Further, all individuals showed the same characteristics as they were all females, under

the age of 35, participating in a food regulated programme with the same dietician, and without any intention to participate in any form of physical activity at the beginning of the behavioural treatment.

Procedural validity was enhanced through a checklist containing critical points of feedback, following the suggestions of Hrycaiko and Martin (1996). Two external raters already familiar with theories and practice of Exercise and Sport Psychology, rated a random number of pre-recorded sessions according to SDT and the study's objectives. The sessions were recorded after the permission of the individuals taking part in the study.

4.7 Results and Discussion

Graphical representation of the data is typical for single case experimental studies. Using this method, change can be meaningfully illustrated. Nevertheless, in addition to showing self-reported scores, a description of the client, the treatment and other background information is necessary (McLeod, 1994).

From the Split-middle technique (SMT) proposed by Kazdin (1982), two quantitative methods were used: a) the technique of percentage change from baseline to the first treatment (level change) and b) the overall percentage change from baseline to intervention mean.

The individuals' characteristics for each condition of the study are presented in Table 4.3. All women could be classified as either overweight or obese according to their BMI scores (Bouchard & Bray, 1996). Their histories showed a lack of physical activity, with the exception of the individual in the non self-determined condition.

| Characteristics Conditions | Age | Height | Weight Before Intervention | BMI | Weight History | Exercise History | Food Consumption Details | Good Influences | Bad Influences |
|-------------------------------|-----|--------|----------------------------------|-------|---|--|--|--|--|
| Autonomy | 35 | 1.62m | 95kg | 36.25 | Age 21: 82kg. After that she followed a yo-yo weight pattern | No physical activities even in her school years | She ate a lot when unhappy | Good commu- nica- tion / relationship with husband | Bad interaction with mother (food matters) & colleagues (general matters) |
| Non self- determined | 25 | 1.59m | 68.7kg | 27.26 | In all her previous years she was 4-5 kg heavier than normal. Her weight problems were more evidenced when she started her new job | Recreational athlete (volleyball/ handball) in her school years & aerobics later (3 times per week) | No particular problems | Good communication with family | Her fiancé who complaint a lot for her weight problems |
| Education | 22 | 1.65m | 92kg | 33.82 | Overweight since childhood/Gained more weight in adolescence and until the age of 21 | Age 21 aerobics and weight training but only for 2 months | Frequent problems with high appetite | Friends and colleagues encouraged her to lose weight | All family members obese. Her mother clinically obese |
| Control | 28 | 1.63m | 77.5kg | 29.24 | No details due to lack of contact with the counsellor | ← | ← | ← | ← |

Table 4.3 Description of the participant's characteristics for each condition of the study.

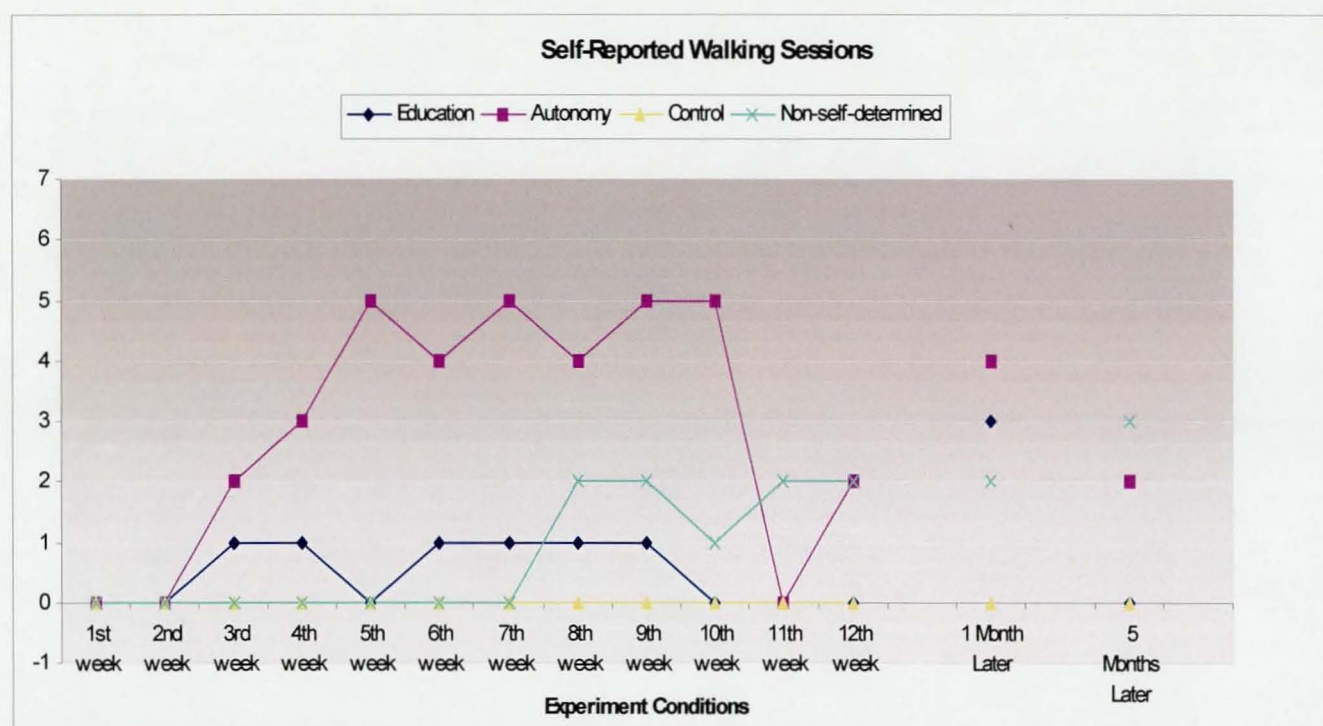


Figure 4.1 Self-reported walking sessions among the individuals in the 4 conditions

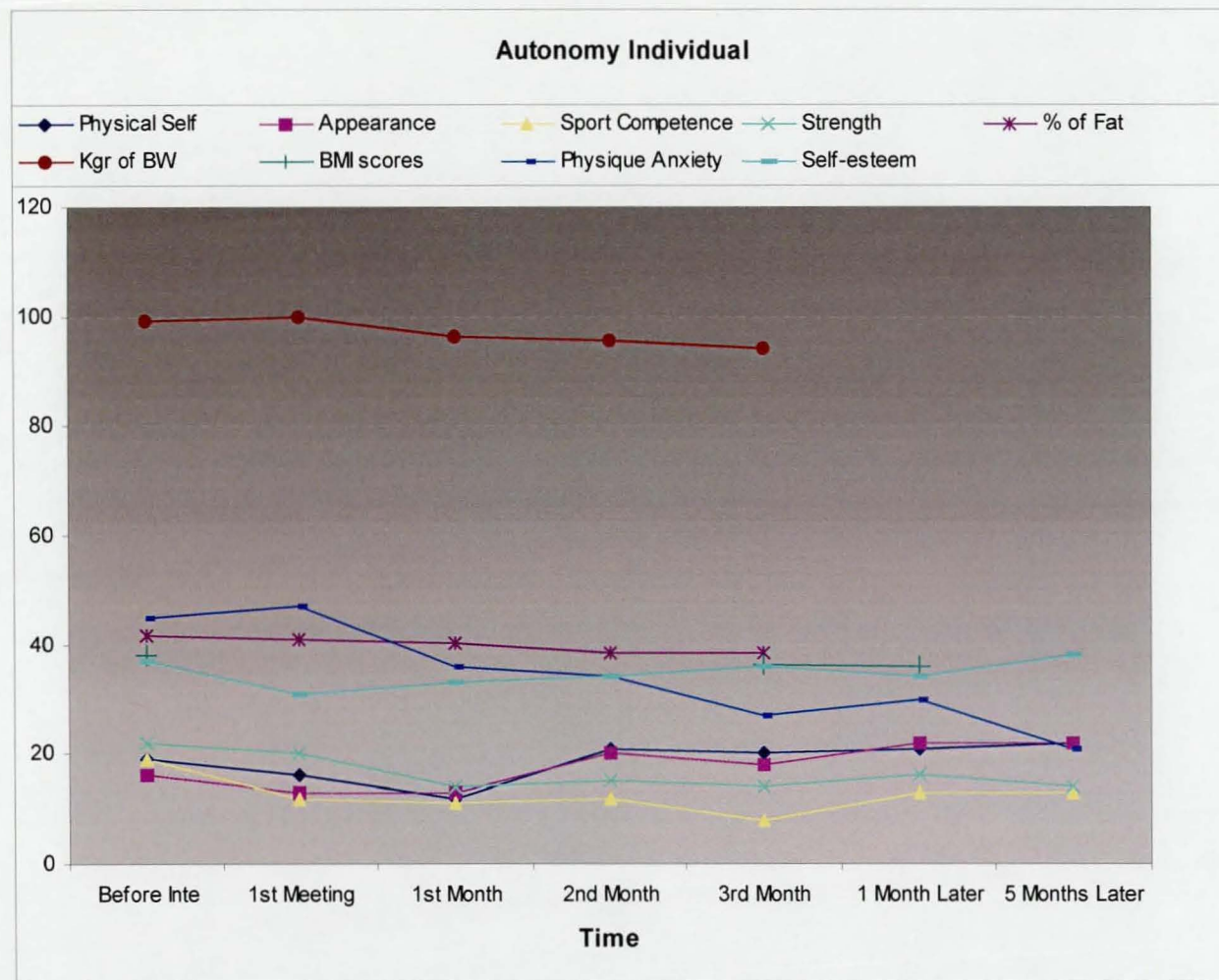


Figure 4.2 Characteristics of the individual in the autonomy condition

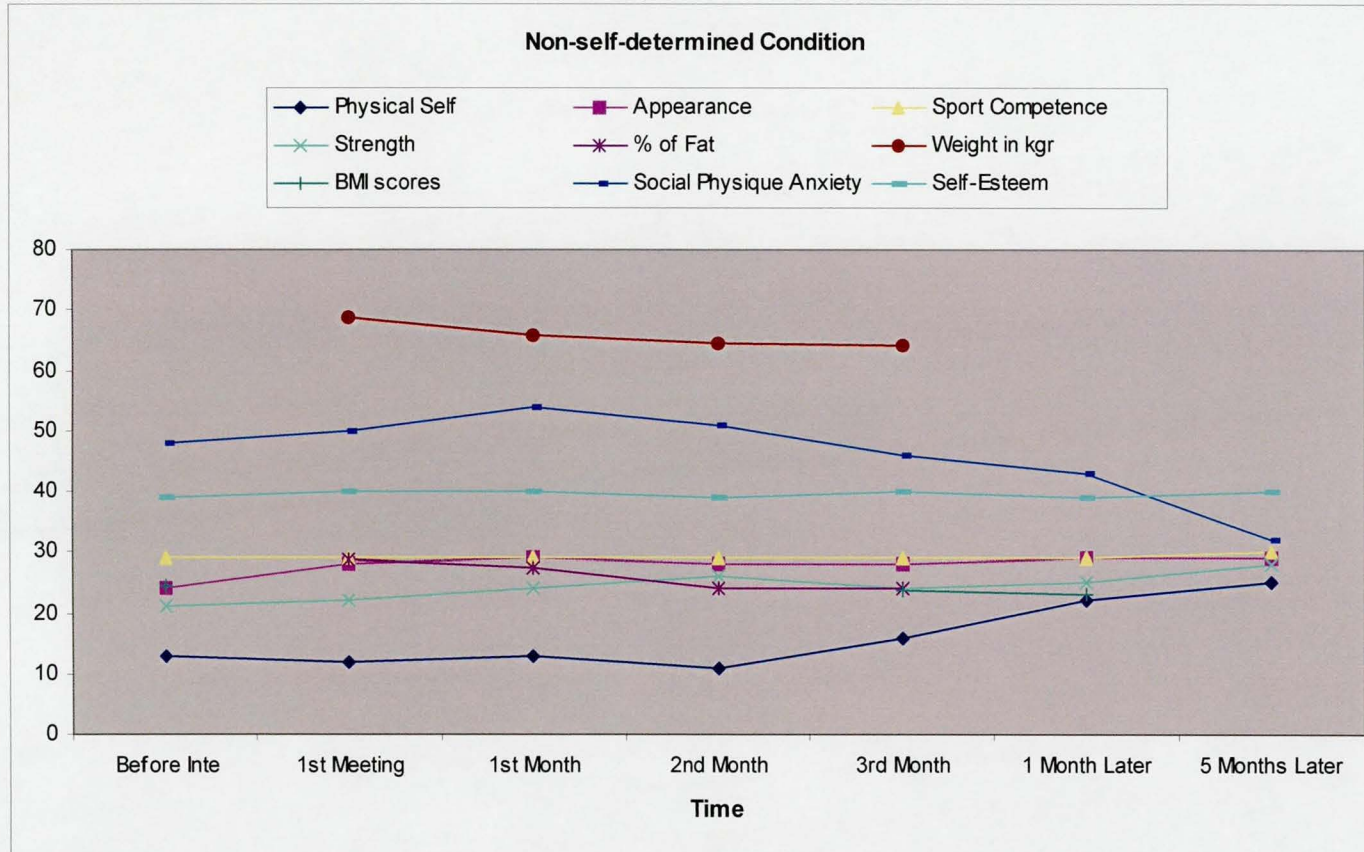


Figure 4.3 Characteristics of the individual in the non self-determined condition

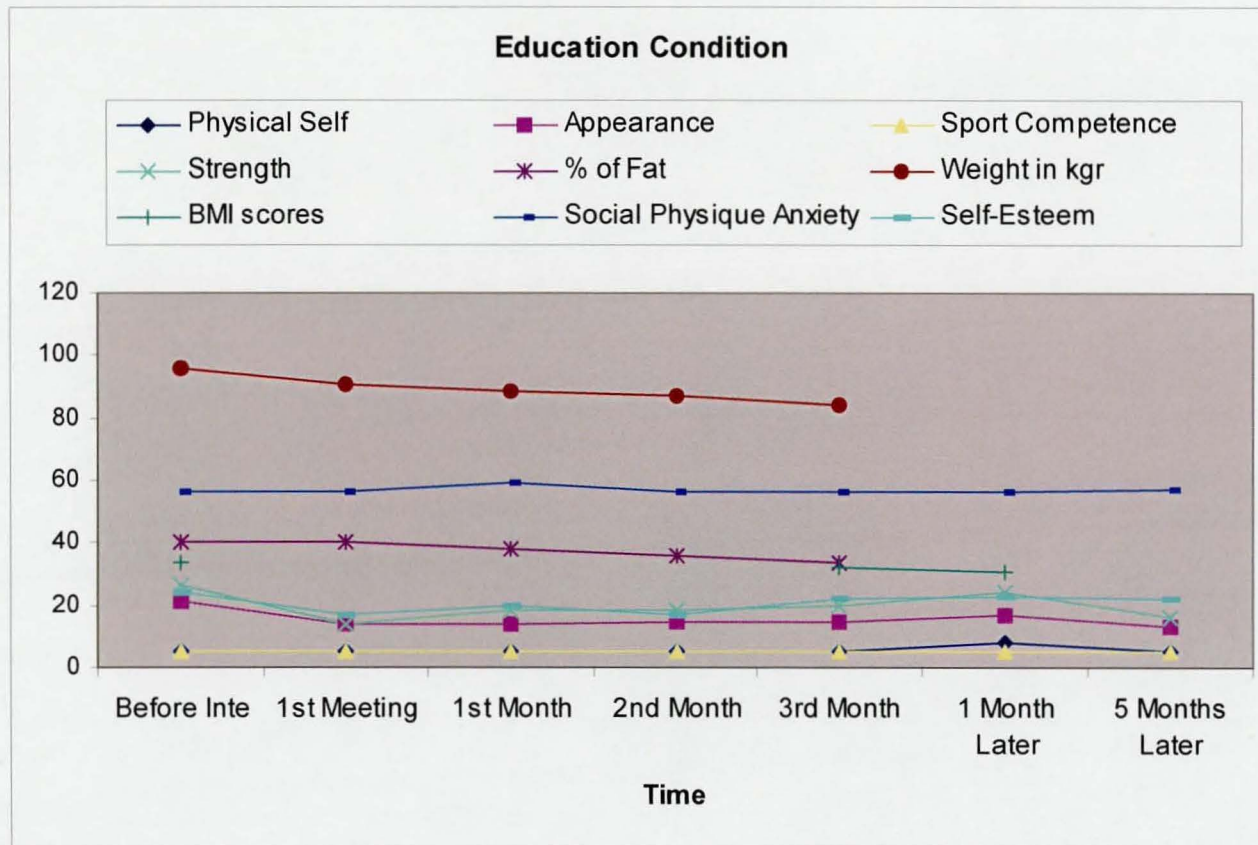


Figure 4.4 Characteristics of the individual in the education condition

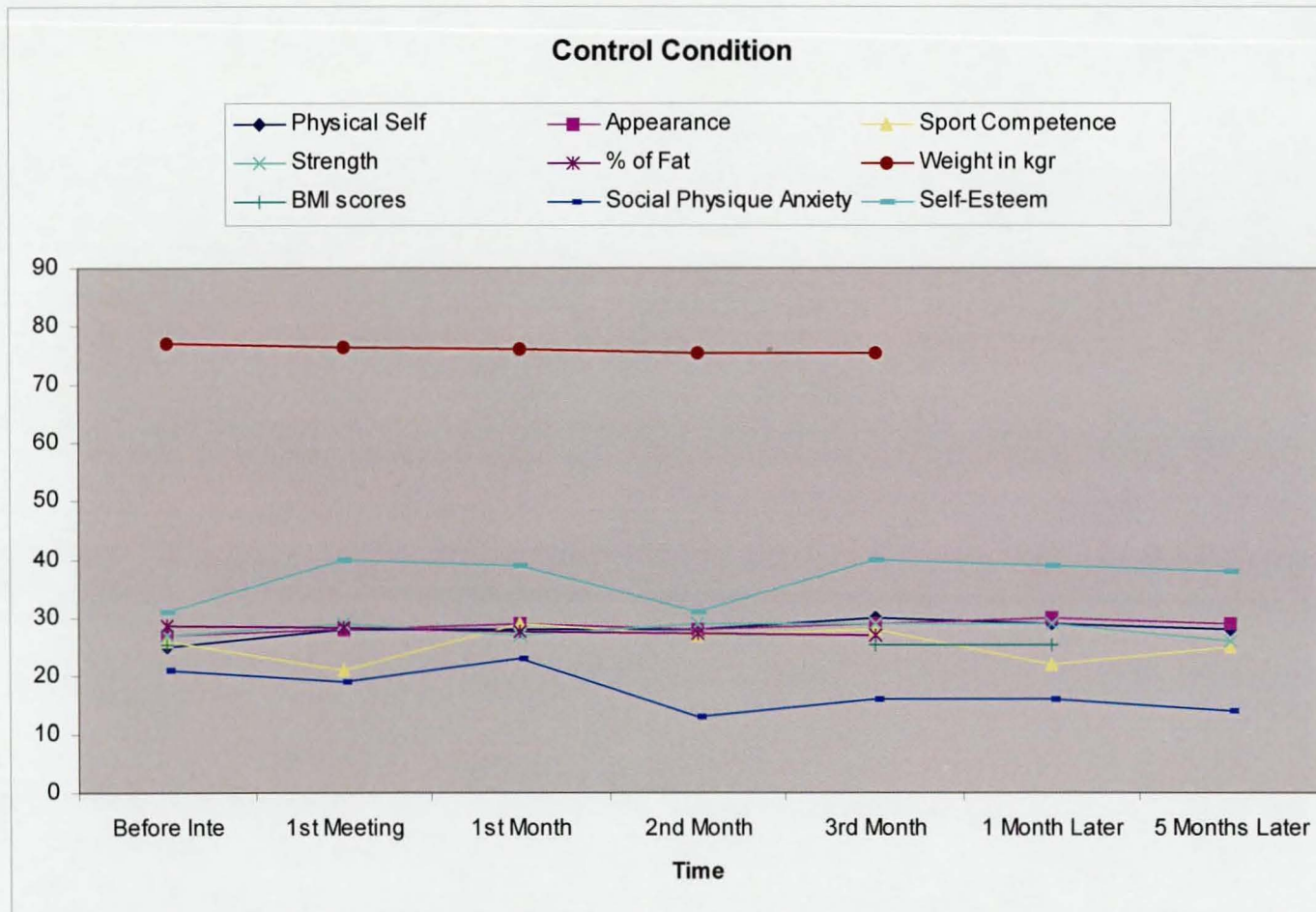


Figure 4.5 Characteristics of the individual in the control condition

Walking was the only physical activity promoted (Figure 4.1). The individual in the autonomy support condition displayed the most profound increase of physical activity during the intervention. This finding is in line with the relevant theory as autonomy condition helped the individual to integrate an extrinsically motivated behaviour. Nevertheless, results show that we need longer intervention periods in order for the increased physical activity rates to last. Conversely, non self-determined individual's participation in physical activity was too limited to produce any positive effects to health (Saris, 1996). Nevertheless, as non self-determined feedback became more distant (5 months later) the individual in this condition engaged in frequent exercise sessions (gym related exercise). Previous exercise experience may have played a central role in this decision. The individuals in the education and the control condition displayed only minor changes and no changes, respectively.

Self-esteem ratings did not show any meaningful change as a result of the intervention and this trend was the same for all participants. Intervention proved to be short in duration for influencing such a global and central characteristic to the self (see Figures 4.2 to 4.5).

Social Physique Anxiety (SPA) ratings revealed a different trend. Autonomy condition revealed a 42% change (on average) from pre- to post- intervention ratings, 50% change one month and 114% change 5 months after the intervention. This finding shows that the application of behavioural techniques in an autonomous environment could improve body image and thus contribute to higher self acceptance and long term weight maintenance (Sarwer et al., 1998). The individual in the non self-determined condition showed only minor changes of SPA during and one month after the treatment, and reached a reduction of 50% five months after the end of the treatment. If this result is coupled with the increased exercise participation reported 5 months after the treatment, it favours the potential reciprocal relation between SPA and physical activity. Future studies can shed more light in the relationship between exercise and SPA. A reduction of SPA by 30% was displayed in the control condition denoting that improved physique may favour the reduction of SPA levels. The scores of the individual participating in the education treatment remained unchanged (Figures 4.2 to 4.5).

Physical self (PS) ratings for both education and control conditions did not reveal any trend as they displayed minor changes before, during and after the intervention. The individual participating in the autonomy condition regardless of the initial reduction of PS ratings by 58%, in comparison to the pre-intervention scores, (maybe due to the application of self-awareness techniques) she did not reveal any percentage change during and after the intervention scores. Nevertheless, she improved her PS scores by 15% 5 months after the termination of the treatment. The individual participating in the non self-determined condition gradually reported higher scores of PS and she reached an improvement of 92% 5 months after the end of the treatment. This could be attributed mainly to significant life changes (separation from a very controlling fiancé), success of the diet treatment, and physical exercise (Figures 4.2 to 4.5).

Sport competence (SC) reports did not reveal any significant change for the participants in the education and the non self-determined conditions. Looking at the scores of these individuals it could be argued that more individualised measures are needed to tackle small changes in the examined variables. The individual participating in the autonomy condition displayed a 50% reduction of perceived SC. This may be due to the fact that no sporting activity was introduced and performed during the intervention, plus the fact that she had limited past sporting experiences. Control condition demonstrated an improvement of perceived SC (19%), during the treatment but this was rather incidental as she returned to her previous scores after the intervention period.

Perceived strength (PS) could be perceived as a demonstration of the given meaning to improved physique and physical strength. Non self-determined individual improved her PS (by 30%) as she was succeeding in her diet treatment. Conversely, the individuals in the autonomy and the education conditions displayed a reduction of PS understanding physical strength as a male characteristic. Future studies need to shed more light on this finding.

The individual in the autonomy condition displayed the highest improvement in perceived **Appearance (A)** from pre-intervention to intervention and post-intervention ratings (17%) and this is a key finding as A is a major contributor of self-esteem (Fox, 1997). The individual participating in the non self-determined condition demonstrated a

lower improvement of A (9%), followed by the individual in the control condition who demonstrated a marginal improvement of 4%. Education condition displayed a reduction of A (19%) and this could be explained by increased perceived vulnerability coming from the opposite sex (Foster & Wadden, 1995).

Body composition measures were carried out trying to spot changes associated to the diet program. Percentage of fat, weight in kg, and BMI scores revealed a successful treatment for all participants. Thus, changes in psychological variables could be attributed mainly to counselling.

4.8 Conclusions

A single case experimental design was employed in a diet programme, using behavioural techniques for a duration of 12 weeks. In accordance with the theoretical propositions of "self determination theory" (Deci & Ryan, 1985), the autonomous supportive environment directed the individual in the self-regulation of her exercise and diet behaviour. The long-term positive effects of such behavioural regulation were evident in physical activity participation and in the improvement of many critical psychological factors. These are in line with the findings of Williams et al. (1996) where autonomous orientation and an autonomy supporting environment were associated with better weight management and maintenance of the lowered weight. The maintenance of the improved psychological variables was evident and this is one of the most important findings of the present study.

Applied behavioural techniques proved effective as conditions of education and control did not improve in any psychological variable (except the improvement of SPA revealed by the control condition). Physical activity, self-esteem, and body image improvement strategies combined with the "stages of change" counselling framework were effective in fostering adaptive psychological profiles in both counselling conditions. Even if the individual in the non self-determined condition did not improve initially in many variables of the study, she displayed a significant improvement five months after the end of the treatment. This could be attributed primarily to significant changes happening in her life (separation from her fiancé who was forcing her to improve her physique controlling her behaviour). Previous exercise involvement provided the background for increased exercise participation that most likely had a

positive impact on her physical self and SPA scores. Finally, non self-determined feedback became more distant, making the integration of healthy behaviours easier.

Leading the movement of obese and overweight individuals through the basic principles of Stages of Change theory was effective. Through the application of SOC and based on the needs of each individual the counsellor can effectively foster or discourage the behaviours in focus. Our evidence showed that the "Transtheoretical model" applied in the exercise context by Prochaska et al. (1994) can be practiced in obesity counselling effectively.

The intervention proved short in duration in order to influence self-esteem. Trying to produce a negative energy balance while fostering related behaviours, made the counselling period too limited to produce big changes in self-esteem and physical-self ratings. Future attempts to influence psychological factors of obese and overweight individuals should aim to interventions of longer duration.

Exercise participation was found critical for the reduction of Social Physique Anxiety. Treasure et al. (1998) have argued that elevated SPA can lead to reduced levels of exercise adherence in public locations. Current study has shown that when individuals are encouraged to engage in physical activity, SPA is decreased considerably. Thus, one major obstacle towards an active life could be removed.

Dependent variables were measured with normative-based questionnaires and this caused problems in the accuracy of the results, as there were variables that reached the higher scores of the scales. Although all the questionnaires in use had acceptable psychometric properties, they were not validated for idiographic use. In this way, they were not sensitive enough to tackle small changes that might take place due to the treatment. There is a clear need for instruments adapted on an individual basis, or else, sensitive enough to tackle minor changes in the examined variables. Shapiro (1961) proposed a way of measuring psychological changes specific to the psychiatric patient, but this approach was only applicable to clinical behaviours. Future studies need to tackle this need for variables examining normal behaviour.

It was not in the scope of this study to propose a new counselling method but rather to test the combination of two widely accepted practices in the treatment of obesity. Results and conclusions have emphasised certain points of application for the counsellor. Changed physiques can take different meanings by different individuals displaying variations in many psychological characteristics. As humans live different

realities according to their mentalities and experiences (Gazzaniga, 1992) idiographic methods are of great value aiming to display these very truths. Using individualised questionnaires can foster the combination of nomothetic and idiographic approaches in the future providing an advancement to the behavioural treatment of obesity.

5. Study 3: Examining Motives for Weight-Loss Diets Among Greeks
Using Self-determination Theory and Self-esteem: A Clustering,
Longitudinal Field Study

5.1 Introduction

As it has been demonstrated with the help of the two previous studies, *autonomy-supporting environment* has the potential of influencing positively, physical self and self-esteem ratings. This was evident both in the exercise and counselling settings while using two distinct -yet complementary- research methods: a *cross-sectional* and an *experimental research* method.

Trying to shed more light on the previous argument, we need to see which are the long-term effects of such an environment for human behaviour and self-perceptions. A longitudinal study would improve our understanding as to the long-term effects of an *autonomous* versus a *controlling* environment.

For this study we need to examine a challenging behaviour that requires high persistence, effort, and motivation. Weight regulation efforts through dietary treatment have all the previous elements of behaviour.

Dietary treatment is fundamental for weight management in the case of the overweight and obese persons and this effort depends on their ability to make long-term lifestyle changes. Additionally, diet does not produce a permanent weight regulation unless it is accompanied by significant changes in everyday life. As a result, the person trying to regulate own weight is in a psychologically fragile state as (s)he is required to reverse the trend that caused obesity to occur (Garrow and O'Cane, 1999).

Compliance with a diet requires increased motivation and support. *Self-determination Theory* (Deci and Ryan, 1985; 1991) provides a suitable theoretical background for explaining dieting behaviour. Further, as prediction of weight loss and weight maintenance is difficult to achieve (Garrow and O'Cane, 1999), autonomy may prove to be more efficient towards predicting such a positive result. Even though the study will not permit the examination of weight change over a period of a year or more, it could provide an indication of the importance of autonomy in the particular context.

As the condition of being over weight in modern society is often considered 'ugly' and 'unhealthy,' there is an intense dislike of it. The lean model, especially for women, has reached a point where "ideal" is a BMI (Body Mass Index) of 19 or less, and as this number is clearly unattainable by the vast majority of women, many associative psychological disorders are becoming more prevalent in Western societies (Garner & Wooley, 1991). This is coupled with media messages and advertisements of "luxury calories," which contribute to the gradual elevation of body weight (Cogan & Ernsberger, 1999). Health priority to reduce obesity has strengthened dieting and weight loss behaviours over the decades. It has been estimated that the amount of money spent in the United States alone in weight-loss services is more than 50 billion dollars, making this kind of business one of the most lucrative in recent history. If one considers that an estimated 40 to 70 percent of adult Americans are using a certain technique to lose weight at any given time, one can imagine the number of people that the previous facts are influencing. Further, it has been repeatedly suggested that even though much of the population of Western countries are dieting, and many resources are being used to eliminate the problem of obesity, its occurrence continues to rise (Miller, 1999).

'Dieting' simply means the replacement of internally regulated eating (instigated by hunger) with cognitively determined and planned, diet-approved eating. When dieting becomes chronic, ignoring internal hunger signals disrupts normal caloric regulation, resulting in risen susceptibility to respond with increased food consumption in a variety of emotionally distressed or dysphoric conditions (Polivy & Herman, 1995). This fact, coupled with the decreased levels of self-esteem and the increased tendency for anxiety and neuroticism, make restrained eaters more susceptible to eating disorders (Polivy & Herman, 1995). Based on these facts, critics of the current weight management model have called for a moratorium on dieting efforts as they demoralise patients, make future weight loss attempts more difficult, and relate to increased morbidity and mortality due to weight fluctuation (Garner & Wooley, 1991). Nevertheless, as many medical benefits are credited with weight losses of as little as 5%-10% of initial weight, moderate and sensible weight loss could play an important role in health improvements and illness prevention (Goldstein, 1992). Further, "weight cycling" as a trend, relates more to aggressive diets aimed at rapid weight reduction, leaving unaffected those seeking more

moderate weight losses and committing to long-term weight stability (NTFPTO, 1994).

If obese persons are treated as individual cases, having certain needs, specific health risks, and chances of successful weight management, it has been repeatedly proposed that weight loss would be beneficial for the majority of those attempting to control their weight (Devlin, Yanovski & Wilson, 2000). According to Devlin, et al. (2000), "...the patient's motivation must be assessed, and interventions must be geared to his or her readiness to undertake the difficult tasks involved in losing weight." (p.859). In this way, it can be concluded that reasons for dieting behaviour per se could be blamed on weight fluctuation and health consequences. Reasonable weight reduction and long-term behavioural changes can play a major role in illness prevention and psychological wellness.

One motivational theory, which attempts to explain human behaviour in various settings, is *Self-determination Theory (SDT)* (Deci & Ryan, 1985; Ryan & Deci, 2000). As previously explained, two types of motivation exist, predicting long-term maintenance of the examined behaviour: *autonomous* and *controlling motives*.

For dieting behaviours, *SDT* posits that enduring behaviour change emanates from the internalisation of the relevant behaviours and values combined with their integration in one's true 'sense of self' in order to become the basis of autonomous regulation (Deci & Ryan, 1985). Thus, long-term maintenance of weight reduction simply means the successful completion of a diet program that comes with personally-valued reasons for engaging in this behaviour (i.e. health benefits).

Relevant studies have shown that controlled motivation is related to rigid and intense dieting behaviours, contributing to poorer well-being (Strong & Huon, 1999). In addition, autonomous reasons for participation, coupled with the tendency to be autonomy-oriented, are important predictors for the long-term successful completion of a diet programme (Williams, Grow, Freedman, Ryan, & Deci, 1996).

Vallerand (1997) proposed that three types of consequences emanate from *controlling* and *autonomy motives*: Cognitive, affective and behavioural consequences. Cognitive consequences emanating from various types of motivation for controlling body weight are related to learning how to control one's own thoughts, attending to the right stimuli, and cognitively analysing hunger and satiety signs, as well as, situations that could endanger the weight regulation efforts (Marlatt, 1995; Vitousec, 1995). Affective states in weight regulation relate to satisfaction, positive

emotions and enhanced moods, as well as, discourage coming from a successful and an unsuccessful effort to control weight. Finally, some of the behavioural consequences of weight regulation are related to physical exercise, persistence, effort exerted, dropout, and final accomplishments. Vallerand (1997) proposed that the more positive consequences result from more *self-determined* forms of motivation while negative outcomes are produced by the least *self-determined motivation* types.

Level and type of self-esteem could be considered as outcomes of the two major motivational styles, as the more controlling the reasons for getting involved in a behaviour are, the more contingent on the outcomes of the behaviour will be self-esteem. This is what is referred to as *contingent self-esteem* (Deci & Flaste, 1995). Conversely, in the case of a sound and stable sense of self, extrinsic regulations have been integrated, intrinsic motives have maintained, and a full regulation of one's emotions has been developed. This is referred to as *true self-esteem*. Fear of failing to achieve the particular outcomes, can formulate --as opposed to feeling good about the self, no matter what the particular outcomes would be--the difference between the *contingent* and the *true* sense of self (Deci & Flaste, 1995).

Based on the previous issues, describing those who try to decrease their weight embodies various psychological factors. Screening dieters based on the three types of consequences proposed to emanate from controlling and autonomy motives (Vallerand, 1997) has not been attempted until now. Further, analysing the long-term consequences of dieting, when having certain motives versus others, could shed more light on the ability of *SDT* to describe success and failure outcomes within the particular context.

Factors hypothesised to act as consequences of the motivational types of intervention, held by those trying to decrease their weight, are the following:

- Physical activity is a public health problem. In industrialised societies inactivity leading to low levels of physical fitness is an important cause of various health impairments. As obese and overweight individuals are generally associated with lower activity levels (Ravussin, 1995), and physical activity is an important health behaviour that can influence many interventions, the assessment of this behaviour is necessary in many different studies and programs (Blair, 1995). In the same venue, regular, moderate exercise holds great potential for an increased metabolism and significant health improvements (Bouchard, Despres, & Tremblay, 1993; Grundy et al., 1999).

This adds to the importance of its assessment when trying to describe an overweight and/or obese sample.

- Physical and global self-esteem descriptions were deemed important since many researchers have argued about the stigmatisation of over-weight individuals in modern Western societies (Crocker, Major & Steele, 1998; Fox, 1997; Page & Fox, 1997). Further, a recent meta-analysis of these persons and their self-esteem, has indicated that a moderate effect exists between these constructs with lower self-esteem being associated with heavier weight (Miller & Downey, 1999).

- In the same domain, *self-enhancement* law posits that individuals are directing the self towards domains that hold a high possibility of success (Baumeister, 1999; Fox, 1997). Assessing the difference between the ideal and real physical-self could significantly contribute to the comprehension of each individual's *self-system*, signifying an area of potential controversy in a person's value system.

- Social Physique Anxiety (SPA) has been proposed as a construct that measures the degree to which individuals become anxious when their physique is evaluated or observed by others (Hart, Leary & Rejeski, 1989). SPA has been found to correlate significantly with body weight, suggesting that this construct may be salient in overweight and/or obese individuals (Bain, Wilson, & Chaikind, 1989). Further, SPA has been accused repetitively for decreased involvement in exercise programs (Hart et al., 1989; McAuley, Bane, Rudolph, & Lox, 1995), while increased age has been proposed to moderate SPA's effects on behaviour (Treasure, Lox, & Lawton, 1998).

Body Mass Index (BMI: Body weight in kg divided by the square of height in meters) has been used repetitively as a definition of overweight (26 kg/m² or more) and obese (30 kg/m² or more) individuals, signifying the onset of risk factors for several common diseases that result in a higher mortality rate (Bouchard & Bray, 1996). Changes in BMI scores signify a relatively accurate measure of changes in dieters' physiques (considering no other changes in energy expenditure have taken place). Consequently, BMI scores were used as indicators of mass change within these 6 months of dieting.

Clustering dieters based on the consequences that certain types of motivation may have (Vallerand & Losier, 1999) has not yet been attempted. In this way, the aims of this study were:

- To cluster dieters according to important psychological variables and,

- To describe the changing pattern of the previously described psychological variables held by dieters within the first 6 months of dieting.

Thus, the purpose of the study was to describe the effects of a dietetic intervention on the particular sample over a period of 4 to 6 months. It was hypothesised that autonomy motives would be related to the most adaptive psychological profiles and, conversely, the more controlling reasons for dieting would be related to the least adaptive profiles. Further, increased levels of self-esteem and low discrepancy scores between the ideal and real physical appearance would be related to less controlling dieting motives. Dieters with lower BMI scores would show a more positive pattern of psychological features, as those having high BMI scores have been repeatedly proposed of having increased health risks (Bouchard & Bray, 1996), decreased self-esteem (Miller & Downey, 1999), and body-related anxiety (Bain, et al., 1989). Additionally, BMI scores would differentiate dieters' psychological characteristics (Miller & Downey, 1999) and physical activity patterns (Fox, 1997).

5.2 Method

5.2.1 Procedure

The study was held in sixteen dieting centres located in six Greek towns. Obese and overweight individuals came for counselling on food related matters aiming to regulate their body weight. In this way, the study was held in real conditions that dietitians face in their everyday contact with clients and not in a superficial nor superimposed environment. Sixteen dietitians from all around Greece were invited to participate in the study.

All new clients were invited to participate. Dieters were asked to take part in the study during their first visit. They were informed about the duration of the study and the fact that three questionnaires had to be completed during the following 4 to 6 months of their diet program (one questionnaire every 2 months). The study was further explained in text format by the author and later more analytically by the dietitians. Those interested filled in the first set of questionnaires and were invited to participate in the next two data collections to take place in the ensuing two and four months, respectively. As an incentive for participating in the study, a TV set was rewarded in a lottery for those participating in all three phases of the study. After data analysis, each dietitian received the results of the study and dieters received a detailed

feedback on the psychological characteristics they displayed during the course of the study.

After a thorough *nutritional assessment* (which is the evaluation of the individual's nutritional status and requirements in an anthropometric, dietary, biochemical and clinical manner), and a *body composition assessment* (by measurements of skin-fold thickness and bioelectrical impedance), the individual followed a weight loss programme which included behavioural advice, and an individualised diet which reduced the *estimated daily requirement* by 500-1000 kcal/day. This energy deficit results in the scientifically-appropriate and reasonable rate of weight loss of 0.5-1.0 kg/week. Generally, the prescribed diet was about 1000-1200 kcal/day (for the obese or overweight woman) and 1500 kcal/day (for the obese or overweight man and/or youngster). The prescribed, hypocaloric diet is a healthy, nutritionally-adequate regime which follows the COMMA dietary guidelines (Garrow, 2000) and model of the Mediterranean diet (Declaration of Common Acceptance, 2000). This particular diet has been proven beneficial for health as it is rich in fruits, vegetables, legumes, seeds, and whole-grain cereals. It includes fish and poultry in moderate amounts, low-fat dairy food on a daily basis, red meat in small amounts, and olive oil as the main source of fat.

No dieters were prescribed a diet lower than 1000 kcal/day in order to avoid a) high attrition rates, b) excessive loss of lean tissue, or c) the possibility of failing to provide essential nutrients in such a restricted diet. Dieters were prescribed 3 meals per day with two snacks of fruits in-between those meals. Diets were changed on a weekly or a bi-weekly basis. Individuals visited the dieticians every 7 or 15 days in order to assess the amount and composition of weight loss, and to change menus with the provision of new recipes, thereby helping the individual to establish healthy eating habits.

5.2.2 Sample

Two hundred and fifty-six individuals (224 females and 32 males, Mean Age=33.9) accepted to participate in the study. From those, one hundred and thirty-five (117 females and 20 males, Mean Age=33.4) filled in the questionnaire of the second phase, and seventy-five (65 females and 10 males, Mean Age=33.84) the questionnaire of the third phase. All individuals were Greek Caucasians. Finally, based on the BMI of the participants at the beginning of the program, 107 were considered obese ($BMI \geq 30$, Mean BMI = 35.05), 71 were considered overweight

($26 \leq \text{BMI} < 30$, Mean BMI = 28.90) and 75 had normal weight ($\text{BMI} < 26$; Mean BMI = 24.09) (Bouchard & Bray, 1996).

5.2.3 Questionnaires

5.2.3.1 Reasons for Dieting. A Greek-language version of the *Treatment Self Regulation Questionnaire* (TSRQ) (Ryan & Connell, 1989) was used to assess autonomous and controlling reasons for participation in a diet program. The questionnaire presents individuals with a stem "I am staying in the weight-loss program because..." followed by several reasons that represent *autonomous* (e.g., "I believe it is the best way to help myself"), *controlling* (e.g., "I want others to see that I am really trying to lose weight"), and *amotivation* (e.g., "I really don't know why") reasons. Each reason was rated on a 5-point scale ranging from *not true at all* (1) to *very true* (5). Confirmatory factor analysis of the questionnaire, based on the responses of the first data collection, revealed two clear factors labelled *Controlling* (seven items) and *Autonomous* (four items) reasons ($\chi^2/\text{df}=2.35$; CFI=.94; RMSEA=.074). Amotivation factor was not supported by CFA.

5.2.3.2 Social Physique Anxiety (SPA). A Greek language version of the Hart et al. (1989) was used to assess body-related anxiety. Items were presented on a 5-point Likert scale formulating a single factor solution. Although the original 12-item questionnaire was used, the 7-item solution that was proposed by Motl and Conroy (2000) was finally supported by confirmatory factor analysis ($\chi^2/\text{df}=2.15$; CFI=.96; RMSEA=.068).

5.2.3.3 Physical Self-perceptions. A Greek language version of the Marsh, Richards, Johnson, Roche, and Treadmayne, (1994) was used to assess physical and general self-concept. The translation of the items in Greek was presented by Zahariadis and Tsorbatzoudis (2000). Seventy items measuring 11 scales of physical self-concept and physical fitness (strength, body fat, activity, endurance/fitness, sports competence, coordination, health, appearance, flexibility, general physical self-concept and self-esteem) were responded to on a 6-point true-false Likert scale. Evidence for the psychometric properties of the questionnaire were provided for both the English (Marsh et al., 1994) and Greek (Zahariadis and Tsorbatzoudis, 2000) versions. Confirmatory factor analysis partly supported the 11-factor solution presented by Marsh et al. (1994) in a simple, first-order analysis ($\chi^2/\text{df}=2.33$; CFI=.88; RMSEA=.053).

5.2.3.4 Physical Activity. Kaiser Physical Activity Survey Questionnaire (KPAS; Ainsworth, Sternfeld, Richardson, & Jackson, 2000). The KPAS questionnaire is an adaptation of the Baecke questionnaire (Baecke, Burema, & Frijters, 1982) that was found to be one of the best assessments of physical activity levels in relation to the most accurate measurement of average daily metabolic rate (Westerterp, 1999). Since KPAS includes a separate measurement of the housework and care-giving activities, it can assess more accurately physical activity in women.

The Greek version of the KPAS questionnaire was administered in all three data collections. KPAS is a self-administered, eight-page instrument containing 75 items. For the purposes of the current study, only the first 38 items that classify physical activity status were used. The first four summary activity indexes of KPAS were used: Housework/care giving, active living habits, exercise/sports, and occupation. With the exception of the care giving section, summary indexes are computed from five-level, categorical responses to questions about participation in various activities. Responses range from "Never" (1) to "Always" (5). Ainsworth et al. (2000) provided test-retest reliability and comparison with direct and indirect measures of physical activity evidence. Intra-class correlations (ICC) of the Greek KPAS, based on 137 individuals who filled in the questionnaire with 2 months intervals, were partly acceptable (*ICC scores*: Care giving=.86; Occupation=.92; Active living habits=.62; Sports and exercise=.64; Σ Physical Activity=.73; Σ Physical Activity without Occupation=.75). For the assessment of the sports / exercise index, the compendium of physical activities was used (Ainsworth et al, 1993).

5.2.3.5 Self-confidence. Confidence in the ability to maintain a healthy eating pattern was assessed with the help of 4 items dealing with the ability felt to keep up a healthy diet pattern, the confidence to maintain a healthy diet at that particular moment, as well as in the future, and the ability to achieve the challenge of succeeding in the programme. Items were responded to on a 7-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (7).

5.2.3.6 Expectations of Achievement. Expectations of achievement for losing weight were assessed with the help of 19 items stemming from the statement "...in relation to the programme you attend what do you expect to achieve in the next two months." A 5-point Likert scale (strongly disagree to strongly agree) was used, and the items were formed based on the results of interviews, open-ended questions and a pilot study.

Confirmatory factor analysis provided support for a 3-factor solution (Food related expectations, expectations based on significant others, and expectations based on objective measures; $\chi^2/df=2.39$; CFI=.92; RMSEA=.074).

5.2.4 Data Analysis

Cluster analysis was used to identify theoretically meaningful subgroups of individuals sharing common characteristics based mainly on their responses. Cluster analysis is a set of multivariate techniques having as a primary purpose to assemble objects based on the characteristics they possess. Thus, cluster analysis deals with the classification of objects (i.e. respondents) so that each object is similar to others in the cluster with respect to a predetermined selection criterion. The final aim is to form clusters that exhibit high internal (within-cluster) homogeneity and high external (between-cluster) heterogeneity (Fair & Black, 2000).

Cluster analysis is the only multivariate technique that uses the variate as specified by the researcher (and not empirically as in the case of all the other techniques). Its solution is totally dependent upon the criteria/variables selected as a basis for similarity measure. This selection should be based on sound, theoretical criteria (Aldenderfer & Blashfield, 1984) and in the current study, selected variables were guided by *SDT* (Deci & Ryan, 1985; Ryan & Deci, 2000) and *Self-esteem* theoretical definitions (Fox, 1997; Harter, 1996).

Following the recommendations of several authors (Fair & Black, 2000; Punj & Stewart, 1983), a combination of the two major clustering methods (hierarchical / agglomerative and non-hierarchical) was used. After variables' scores were standardised (z-scores), Ward's hierarchical method was used to establish the number of clusters and profile the cluster centres. These analyses were based on the Squared Euclidian Distances that created the similarity matrices between the observations. Number of clusters was based on: A) the agglomeration (or else fusion) coefficient that represents the average within-cluster distance; A sudden increase of this coefficient indicates that two dissimilar clusters have been merged. And B) considerations about a convenient interpretation of the clusters.

Cluster centres found in the previous method were used as seed-points for the non-hierarchical method of k-means. Following that, observations were assigned to the nearest seed-point. As non-hierarchical methods have many advantages in comparison to the hierarchical ones, when the researcher can specify with a reasonable accuracy the initial cluster centres (Hair & Black, 2000), the application of

the former methods can fine-tune the results by minimising the within-cluster variance and by maximising the between-cluster variance. Cluster solution was validated with the use of two techniques suggested by Aldenderfer and Blashfield (1984). The first technique involves the degree of replicability of a certain cluster solution across various sub-groups of the same population, and the second is related to tests of significance comparing the extracted clusters on the variables not used in the formation of the cluster solution. The latter way of extracting a robust cluster solution was used by Vlachopoulos, Karageorghis and Terry (2000) using *SDT* to extract links among motivation types and various emotional and behavioural variables in the PE context.

The results of the first cluster validation technique are presented in Table 5.1. Discriminant Analysis was used to compare the extracted cluster solutions. The results of the second validation technique are presented in Table 5.2, where each hierarchical cluster solution is validated with the help of 21 variables not included in the extraction of the solution.

| Data Set | Number of Clusters | Ward's Method: N in each Cluster | | | | K-Means: N in each Cluster | | | | % of Cases correctly classified (*) |
|--|--------------------|----------------------------------|-----|-----|----|----------------------------|-----|------|---|-------------------------------------|
| 1 st (Overall) | 3 | 55 | 104 | 108 | 59 | 85 | 103 | 74.9 | | |
| 1 st (1 st Half) | 3 | 56 | 25 | 40 | 45 | 29 | 47 | 90.1 | | |
| 1 st (2 nd Half) | 3 | 27 | 54 | 45 | 36 | 40 | 50 | 81 | | |
| 2 nd | 3 | 34 | 77 | 25 | 51 | 37 | 48 | 68.4 | | |
| 3 rd | 4 | 18 | 28 | 27 | 2 | 14 | 29 | 30 | 2 | 89 |

Table 5.1 Number and descriptives of clusters for each data collection.

(*) Result based on Discriminant Analysis comparing the stability of each solution.

| Clustering Procedure | Data Set | Valid N | Number of Clusters | External Validity (*) | Dependent Variables (**) |
|----------------------|-----------------|---------|--------------------|-----------------------|--|
| K-means | 1 st | 246 | 3 | 12/21 | Perceived Health (PH), Perceived Co-ordination (PC), Perceived Fat (PF), Perceived Sport Competence (PSC) Physical Self Worth (PSW) Perceived Appearance (PA) Perceived Strength (PS) Perceived Flexibility (PFI) Perceived Aerobic Ability (PAA) Social Physique Anxiety (SPA) KPAS |
| Ward's | 1 st | 246 | 3 | 12/21 | KPAS (no occupation) PC, PF, PSC, PSW, PA, PS, PFI, PAA, SPA, Expectations on Others, KPAS (Exercise), KPAS |
| K-means | 2 nd | 136 | 3 | 6/21 | SPA, PC, PF, PSW, PA, PS |
| Ward's | 2 nd | 136 | 3 | 4/21 | SPA, PF, PSW, PA |
| K-means | 3 rd | 75 | 4 | 6/21 | SPA, PF, PSW, PA, PS, PFI |
| Ward's | 3 rd | 75 | 4 | 8/21 | SPA, PC, PF, PSC, PSW, PA, PS, PFI |

Table 5.2 Clustering solutions and degrees of external validity for each data set.

(*). The external validity column indicates the number of dependent variables on which the clusters differed significantly from a possible 21 (Level of significance $p < .01$).

(**). Dependent variables that differed significantly in each cluster solution ($p < .01$)

5.3 Results

5.3.1 Descriptive Statistics

All subscales showed an acceptable level of internal consistency. Means and standard deviations for the 1st, 2nd and 3rd data sets are presented in Table 5.3. Physical activity scores compared with the data presented by Sternfeld, Ainsworth and Quesenberry (1999) are lower for the current sample with the "Occupation Index" and the "Overall Activity" scores (including occupation index) showing the biggest difference.

Self-perception scores of the 2nd data set are quite lower than in the 1st and 2nd data sets. Reasons for such a decline were not examined in this study.

| Variable | 1 st Data Set | | 2 nd Data Set | | 3 rd Data Set | |
|--------------------|--------------------------|------|--------------------------|------|--------------------------|------|
| | M | SD | M | SD | M | SD |
| Discrepancy | 1.83 | .88 | 1.60 | .79 | 1.57 | .97 |
| Confidence | 5.01 | 1.35 | 5.00 | 1.28 | 4.99 | 1.34 |
| Autonomy | 6.08 | .87 | 6.06 | .81 | 6.11 | .80 |
| Control | 3.45 | 1.26 | 3.36 | 1.12 | 3.39 | 1.23 |
| SPA | 3.28 | .85 | 3.22 | .81 | 3.10 | .88 |
| Perceived Health | 2.49 | .94 | 1.37 | 1.48 | 2.42 | 1.02 |
| P. Coordination | 3.94 | .92 | 2.12 | 2.09 | 3.95 | .96 |
| P. Phys. Activity | 2.38 | 1.31 | 1.30 | 1.48 | 2.41 | 1.25 |
| P. Fat | 3.68 | 1.25 | 1.60 | 1.67 | 3.22 | 1.21 |
| P. Sp. Compet. | 2.61 | 1.22 | 1.49 | 1.64 | 2.77 | 1.19 |
| P. PSW | 3.13 | 1.15 | 1.81 | 1.89 | 3.42 | 1.14 |
| P. Appearance | 4.19 | .87 | 2.25 | 2.20 | 4.25 | .95 |
| P. Strength | 3.55 | 1.10 | 1.91 | 1.96 | 3.78 | 1.11 |
| P. Flexibility | 3.55 | 1.12 | 1.97 | 2.00 | 3.78 | 1.04 |
| P. Aerobic Ability | 2.40 | 1.09 | 1.33 | 1.47 | 2.52 | 1.06 |
| Self Esteem | 4.68 | .78 | 2.49 | 2.42 | 4.69 | .97 |
| Expec. on Food | 4.08 | .60 | 4.02 | .60 | 3.98 | .67 |
| Expec. on Others | 3.67 | .81 | 3.73 | .76 | 3.73 | .80 |
| Objective Expec. | 4.40 | .56 | 4.41 | .57 | 4.33 | .56 |
| BMI | 29.75 | 5.65 | 28.99 | 5.32 | 29.39 | 4.93 |
| KPAS (House A.) | 2.34 | .81 | 2.23 | .77 | 2.27 | .75 |
| KPAS (Occup.) | 1.64 | 1.36 | 1.64 | 1.36 | 1.45 | 1.31 |
| KPAS (Active H.) | 2.72 | .68 | 2.84 | .68 | 2.90 | .73 |
| KPAS (Exercise) | 2.08 | 1.17 | 2.06 | 1.16 | 2.01 | 1.16 |
| KPAS (wt Occ.) | 8.80 | 2.06 | 8.77 | 2.19 | 8.66 | 2.07 |
| KPAS (no Occ.) | 7.17 | 1.73 | 7.14 | 1.91 | 7.21 | 1.91 |
| Valid N (listwise) | 245 | | 136 | | 75 | |

Table 5.3 Descriptive statistics of all the data sets.

5.3.2. *Correlations*

The correlations of all the examined variables for the 1st, 2nd and 3rd phases are presented in Tables 5.4, 5.5, and 5.6 respectively. It seems that there is a trend of positive correlations among the variables examining the positive psychological characteristics. Also apparent are negative correlations among those variables and the variables describing either the negative psychological characteristics or the physiological variables describing the magnitude of obesity.

| <i>Variable</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------------------------------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|------|-------|----|
| 1. Autonomy | | | | | | | | | | | | | | | | | | | | |
| 2. Control | .08 | | | | | | | | | | | | | | | | | | | |
| 3. Social Physique Anxiety | -.10 | .27** | | | | | | | | | | | | | | | | | | |
| 4. Confidence | .30* | -.03 | -.30** | | | | | | | | | | | | | | | | | |
| 5. Perceived Health | .08 | -.08 | .22** | -.02 | | | | | | | | | | | | | | | | |
| 6. Perceived Coordination | .11 | -.10 | -.29** | .30** | .02 | | | | | | | | | | | | | | | |
| 7. Perceived Physical Activity | .01 | -.06 | -.19** | .17** | -.05 | .43** | | | | | | | | | | | | | | |
| 8. Perceived Fat | .11 | .32** | .51** | -.23** | .19** | -.36** | -.16** | | | | | | | | | | | | | |
| 9. Perceived Sport Competence | .05 | -.13* | -.33** | .23** | -.06 | .59** | .69** | -.27** | | | | | | | | | | | | |
| 10. Physical Self Worth | .00 | -.20* | -.54** | .34** | -.16** | .55** | .30** | -.63** | .41** | | | | | | | | | | | |
| 11. Perceived Appearance | .02 | -.17** | -.39** | .20** | -.17** | .45** | .21** | -.54** | .28** | .61** | | | | | | | | | | |
| 12. Perceived Strength | .11 | -.13* | -.26** | .33** | -.28** | .42** | .37** | -.29** | .52** | .52** | .44** | | | | | | | | | |
| 13. Perceived Flexibility | .00 | -.09 | -.27** | .24** | -.03 | .71** | .39** | -.38** | .55** | .50** | .42** | .55** | | | | | | | | |
| 14. Perceived Aerobic Ability | .06 | -.13* | -.35** | .33** | -.13* | .63** | .59** | -.40** | .71** | .55** | .39** | .65** | .63** | | | | | | | |
| 15. Self-Esteem | .14* | -.25** | -.37** | .21** | -.21** | .48** | .15* | -.43** | .27** | .53** | .62** | .33** | .34** | .38** | | | | | | |
| 16. Food Related Expectations | .28* | .06 | -.01 | .43** | .05 | .11 | .02 | -.02 | .04 | .06 | .05 | .11 | .07 | .09 | .07 | | | | | |
| 17. Expectations on Others | .12* | .36** | .04 | .23** | -.00 | .08 | .00 | .03 | -.04 | .05 | .08 | .08 | .05 | .04 | .07 | .35** | | | | |
| 18. Objective Expectations | .16* | .17** | .08 | .27** | .03 | .06 | -.06 | .05 | -.03 | .00 | .04 | .01 | -.01 | -.03 | .07 | .55** | .53** | | | |
| 19. BMI (1 st data set) | .24** | .25** | .19** | .01 | .07 | -.28** | -.08 | .67** | -.20** | -.37** | -.34** | -.08 | -.28** | -.27** | -.26** | .03 | .07 | -.01 | | |
| 20. Discrepancy S. | .05 | .13* | .36** | .01 | .07 | -.16** | -.14* | .34** | -.21** | -.31** | -.28** | -.24** | -.20** | -.26** | -.24** | .04 | .04 | .10 | .29** | |

Table 5.4 Correlations among the examined variables of the 1st data set.

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------------------------------|-------|--------|--------|--------|-------|-------|-------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|------|-------|----|
| 1.Autonomy | | | | | | | | | | | | | | | | | | | | |
| 2.Control | .08 | | | | | | | | | | | | | | | | | | | |
| 3.Social Physique Anxiety | -.12 | .45** | | | | | | | | | | | | | | | | | | |
| 4.Confidence | .51** | .00 | -.34** | | | | | | | | | | | | | | | | | |
| 5.Perceived Health | -.09 | .02 | .16* | -.08 | | | | | | | | | | | | | | | | |
| 6. Perceived Coordination | .15 | -.28** | -.34** | .26** | .81** | | | | | | | | | | | | | | | |
| 7. Perceived Physical Activity | -.05 | -.19* | -.16 | .13 | .69** | .84** | | | | | | | | | | | | | | |
| 8. Perceived Fat | -.05 | .53** | .53** | -.25** | .82** | .79** | .70** | | | | | | | | | | | | | |
| 9. Perceived Sport Competence | .05 | -.19* | -.29** | .31** | .72** | .90** | .88** | .69** | | | | | | | | | | | | |
| 10.Physical Self Worth | .09 | -.27** | -.53** | .42** | .76** | .91** | .78** | .68** | .87** | | | | | | | | | | | |
| 11. Perceived Appearance | .03 | -.18* | -.37** | .29** | .80** | .94** | .81** | .79** | .86** | .92** | | | | | | | | | | |
| 12. Perceived Strength | .18* | -.14 | -.31** | .33** | .73** | .93** | .82** | .76** | .89** | .90** | .91** | | | | | | | | | |
| 13. Perceived Flexibility | .14 | -.15 | -.23** | .17* | .78** | .96** | .84** | .77** | .91** | .90** | .92** | .93** | | | | | | | | |
| 14. Perceived Aerobic Ability | .10 | -.11 | -.28** | .36** | .70** | .90** | .86** | .69** | .92** | .88** | .86** | .91** | .91** | | | | | | | |
| 15.Self-Esteem | .10 | -.32** | -.43** | .26** | .80** | .94** | .81** | .80** | .86** | .92** | .97** | .91** | .91** | .86** | | | | | | |
| 16.Food Related Expectations | .36** | -.15 | -.19* | .56** | -.01 | .26** | .03 | -.25** | .23** | .26** | .22** | .16* | .08 | .16 | .18* | | | | | |
| 17.Expectations on Others | .23** | .23 | .06 | .42** | -.00 | .14 | .03 | -.04 | .18* | .23** | .26** | .20* | .16 | .21* | .16 | .35** | | | | |
| 18. Objective Expectations | .34** | .03 | -.03 | .45** | -.10 | .18* | .00 | -.13 | .16* | .18* | .27** | .10 | .07 | .12 | .20* | .66** | .56** | | | |
| 19. BMI (2 nd data set) | .08 | .11 | .25** | -.08 | .15 | -.20* | -.05 | .59** | -.24** | -.41** | -.29** | -.16 | -.20* | -.19* | -.21* | -.07 | -.08 | -.13 | | |
| 20.Discrepancy S. | -.12 | .11 | .42** | -.30** | .11 | -.08 | -.07 | .41** | -.20* | -.36** | -.27** | -.24** | -.16 | -.21* | -.21* | -.12 | -.12 | -.05 | .31** | |

Table 5.5 Correlations among the examined variables of the 2nd data set.

| <i>Variable</i> | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------------------------------------|-------|--------|--------|-------|--------|--------|-------|--------|-------|--------|--------|-------|--------|-------|--------|-------|-------|------|-------|----|
| 1. Autonomy | | | | | | | | | | | | | | | | | | | | |
| 2. Control | .23* | | | | | | | | | | | | | | | | | | | |
| 3. Social Physique Anxiety | -.04 | .39** | | | | | | | | | | | | | | | | | | |
| 4. Confidence | .42** | .02 | -.19 | | | | | | | | | | | | | | | | | |
| 5. Perceived Health | -.00 | .16 | .01 | .14 | | | | | | | | | | | | | | | | |
| 6. Perceived Coordination | .10 | -.14 | -.26* | .21 | -.15 | | | | | | | | | | | | | | | |
| 7. Perceived Physical Activity | -.03 | -.09 | -.06 | .01 | -.04 | .36** | | | | | | | | | | | | | | |
| 8. Perceived Fat | .10 | .36** | .55** | -.21 | .11 | -.26* | -.17 | | | | | | | | | | | | | |
| 9. Perceived Sport Competence | -.06 | -.20 | -.36** | .18 | -.00 | .65** | .61** | -.37** | | | | | | | | | | | | |
| 10. Physical Self Worth | -.01 | -.27* | -.54** | .33** | -.06 | .47** | .24* | -.66** | .53** | | | | | | | | | | | |
| 11. Perceived Appearance | .03 | -.23* | -.38** | .23* | .01 | .40** | .14 | -.47** | .32** | .67** | | | | | | | | | | |
| 12. Perceived Strength | -.07 | -.01 | -.25* | .14 | -.23 | .51** | .26* | -.19 | .41** | .37** | .26* | | | | | | | | | |
| 13. Perceived Flexibility | .01 | -.15 | -.26* | .09 | -.07 | .73** | .29** | -.32** | .53** | .52** | .40** | .55** | | | | | | | | |
| 14. Perceived Aerobic Ability | -.11 | -.10 | -.28* | .28* | -.08 | .58** | .47** | -.29** | .68** | .55** | .37** | .58** | .59** | | | | | | | |
| 15. Self-Esteem | .07 | -.32** | -.38** | .16 | -.35** | .49** | .10 | -.41** | .34** | .51** | .73** | .42** | .43** | .34** | | | | | | |
| 16. Food Related Expectations | .28* | -.01 | -.13 | .51** | -.01 | .18 | -.08 | -.03 | .07 | .14 | .25* | .15 | .00 | .05 | .20 | | | | | |
| 17. Expectations on Others | .29** | .34** | -.07 | .32** | .05 | .24* | .21 | -.04 | .18 | .24* | .38** | .20 | .14 | .18 | .16 | .47** | | | | |
| 18. Objective Expectations | .29* | .10 | -.24* | .39** | -.06 | .26* | .03 | -.23* | .11 | .23* | .35** | .17 | .10 | .16 | .26* | .66** | .55** | | | |
| 19. BMI (3 rd data set) | .13 | .16 | .41** | .02 | .13 | -.31** | -.11 | .71** | -.27* | -.50** | -.37** | .17 | -.40** | -.27* | -.32** | .10 | .00 | -.18 | | |
| 20. Discrepancy S. | .05 | -.06 | .26* | -.16 | -.06 | -.19 | -.02 | .47** | -.20 | -.38** | -.37** | -.24* | -.31** | -.19 | -.31** | .01 | -.12 | -.12 | .36** | |

Table 5.6 Correlations among the examined variables of the 3rd data set

5.3.3 Reliability

Reliability analysis of all subscales revealed acceptable scores with Alphas ranging from .70 to .91.

5.3.4 Analysis of Variance

Groups based on BMI scores of the 1st data set (Group 1 BMI <26, N=75; Group 2 26≤BMI<30, N=71; Group 3 BMI≥30, N=107) revealed significant mean differences for the Overall Physical Activity (PA) with Occupation ($F(2,247)=5.61$, $p<.004$), Overall PA without Occupation ($F(2,247)=3.05$, $p<.049$), and the Exercise/Sport PA Index ($F(2,247)=8.91$; $p<.001$). *Post hoc test* (Scheffe) revealed significant differences between the 1st and 3rd groups for Overall PA with Occupation (Group 1= 9.31; Group 3= 8.30, $p<.005$) and for the Exercise/Sport Index (Group 1= 2.51; Group 3= 1.77, $p<.001$).

One way Anova test examining the same groups revealed also significant differences for *Autonomy* ($F(2,244)=9.71$, $p<.001$; Scheffe: Group 1= 5.77; Group 3= 6.33, $p<.001$), *Control* ($F(2,244)=5.47$, $p<.005$; Scheffe: Group 1= 3.14; Group 3= 3.74, $p<.007$), *Discrepancy* ($F(2,250)=12.74$, $p<.001$; Scheffe: Group 1= 1.44; Group 2= 1.88; Group 3= 2.07, $p<.007$), *Social Physique Anxiety* ($F(2,247)=4.98$, $p<.008$; Scheffe: Group 1= 3.09; Group 3= 3.48, $p<.01$), *Perceived Health* ($F(2,247)=6.76$, $p<.001$; Scheffe: Group 2= 2.15; Group 3= 2.66, $p<.02$), *Perceived Coordination* ($F(2,247)=9.35$, $p<.001$; Scheffe: Group 1= 4.30; Group 3= 3.72, $p<.000$), *Perceived Fat* ($F(2,247)=84.19$, $p<.001$; Scheffe: Group 1= 2.64; Group 2= 3.51, Group 3= 4.54, $p<.001$), *Sport Competence* ($F(2,247)=6.54$, $p<.002$; Scheffe: Group 1= 2.95; Group 3= 2.31, $p<.002$), *Physical Self Worth* ($F(2,247)=14.55$, $p<.000$; Scheffe: Group 1= 3.56; Group 3= 2.71, $p<.001$), *Perceived Appearance* ($F(2,247)=8.98$, $p<.001$; Scheffe: Group 1= 4.48; Group 3= 3.95, $p<.001$), *Perceived Flexibility* ($F(2,247)=8.15$, $p<.001$; Scheffe: Group 1= 3.95; Group 3= 3.27, $p<.001$), *Perceived Aerobic Ability* ($F(2,247)=9.92$, $p<.000$; Scheffe: Group 1= 2.79; Group 3= 2.08, $p<.001$), and *Self-esteem* scores ($F(2,247)=5.11$, $p<.007$; Scheffe: Group 1= 4.86; Group 3= 4.51, $p<.01$).

5.3.5 Cluster Analysis

Following the suggestions of various authors (Aldenderfer & Blashfield, 1984; Hair & Black, 2000), cluster analysis was based on *SDT* (Deci & Ryan, 1985), and *self-esteem formation* (Fox, 1997; Sonstroem, 1997a). From the *SDT*, only the control

variable was included in the analysis as the variable of autonomy did not classify the group with a stable cluster solution. Further the variables of A. the discrepancy between the perceived and the preferred physical appearance, and B. BMI (Body Mass Index), were used trying to match the importance of the *real* and the *perceived* physical appearance for the dieting individuals.

Separate measures of clusters were performed for each data collection set. As previously discussed, a combination of a hierarchical (Ward's method) and non-hierarchical methods (k-means) was performed, trying to recalculate the cluster centroids and fine-tune the results by allowing the switching of cluster solution.

In order to validate the stability of the two clustering solutions for each data set, significance tests were performed on the variables not used to generate the cluster solutions. This procedure is probably among the best to validate a clustering solution (Aldenderfer & Blashfield, 1984). According to the results of the ANOVA tests, using all 21 external variables, both clustering methods that were contrasted for the 1st data set revealed significant differences in 12 variables (Table 5.2). The 2nd and 3rd data sets revealed significant differences in unequal number of variables between the two clustering methods (Table 5.2).

In checking the reliability of the hierarchical clustering solution, the first data set was randomly split in half and the cluster solution was compared for the two data sets. As the results showed, both data sets were classified with the same cluster solution while using both hierarchical and non-hierarchical methods, fostering in this way the 3 cluster solution (Table 5.1). Discriminant analysis was used to assess the stability of cluster solution for each data set. Results revealed an acceptable percentage of cases for every data set except the 1st and the 2nd, which were marginally acceptable (74.9%) and unacceptable (68.4%) respectively (Table 5.1). Reasons for these results could be traced on the homogeneity of the cluster solutions extracted from the 2nd data set (Figure 5.2).

5.3.5.1 Cluster Characteristics

Figures 5.1, 5.2 and 5.3 show the cluster profiles for each data set expressed in standardised scores (z-scores). Z-scores for all the examined variables of the study are presented in figures 5.4, 5.5, and 5.6. The following description of the profiles is based on the clusters of the first data set (Figures 5.1 and 5.4).

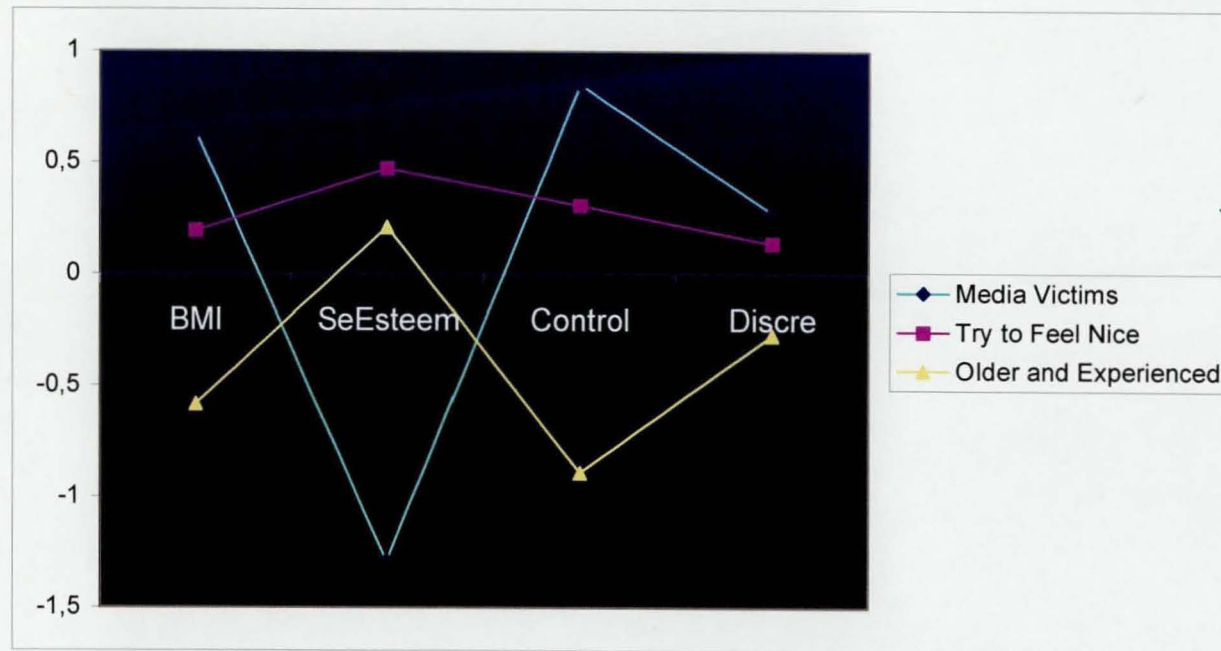


Figure 5.1 Description of the 3 clusters for the 1st data set (z-scores)

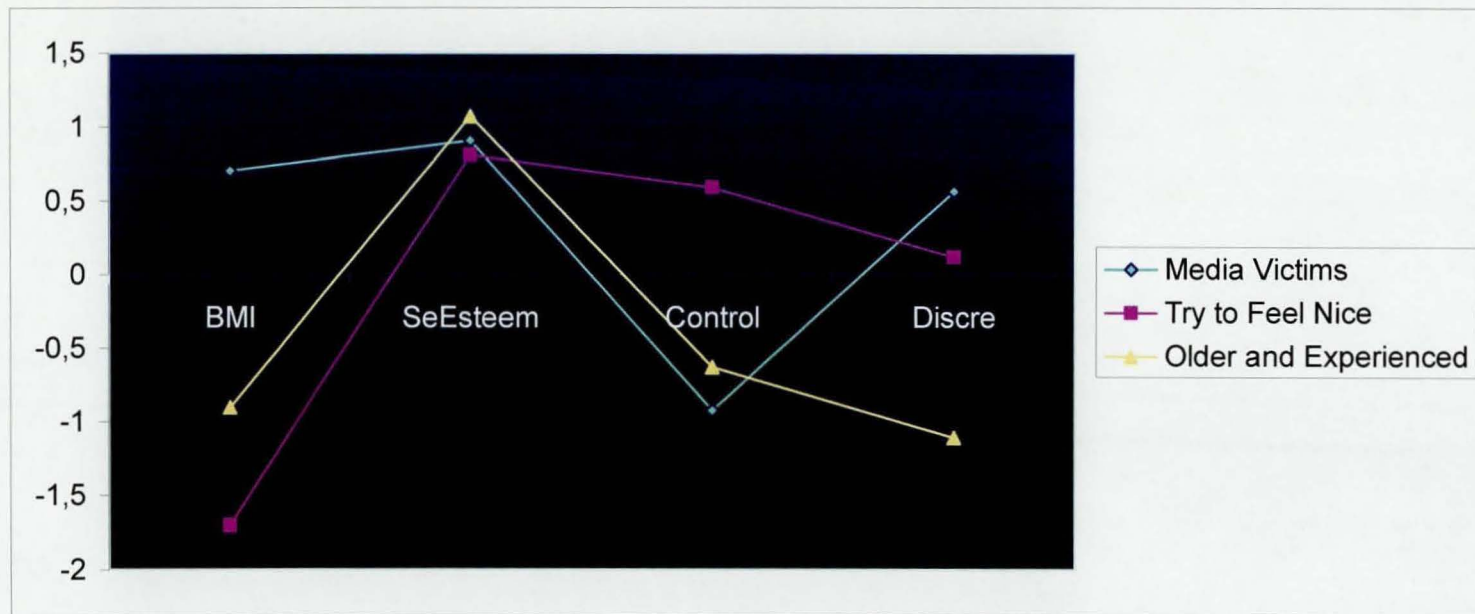


Figure 5.2 Description of the 3 clusters for the 2nd data set

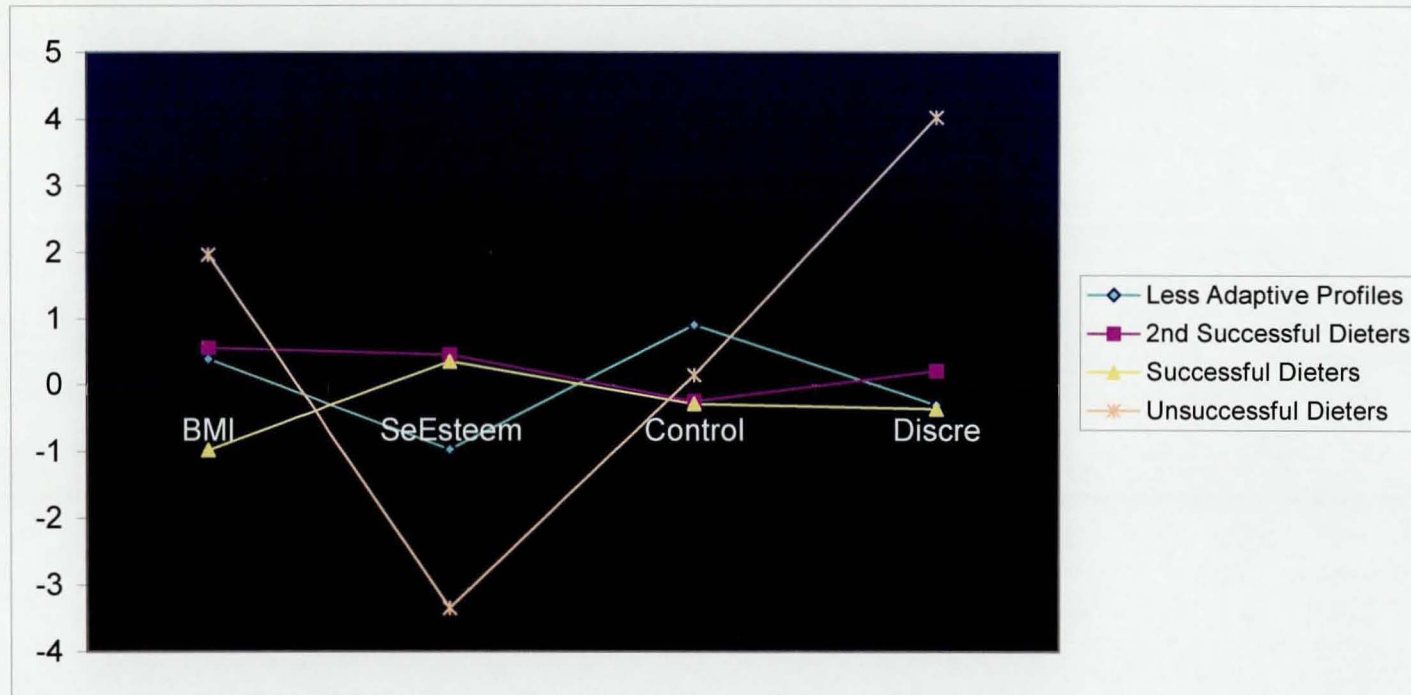


Figure 5. 3 Description of the 4 clusters for the 3rd data set (z-scores)

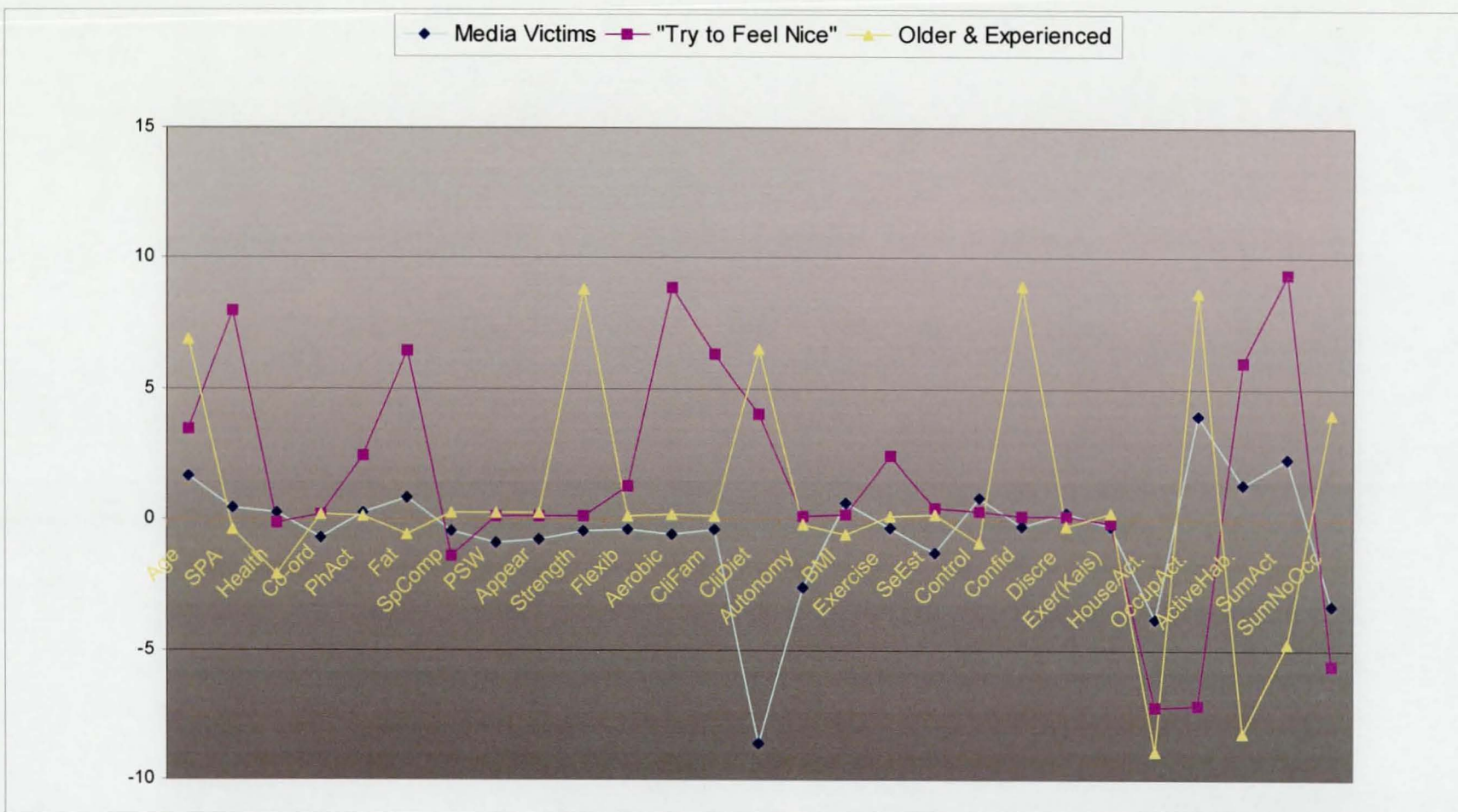


Figure 5.4 Description of clusters for the 1st data set based on the z-scores of all the examined variables

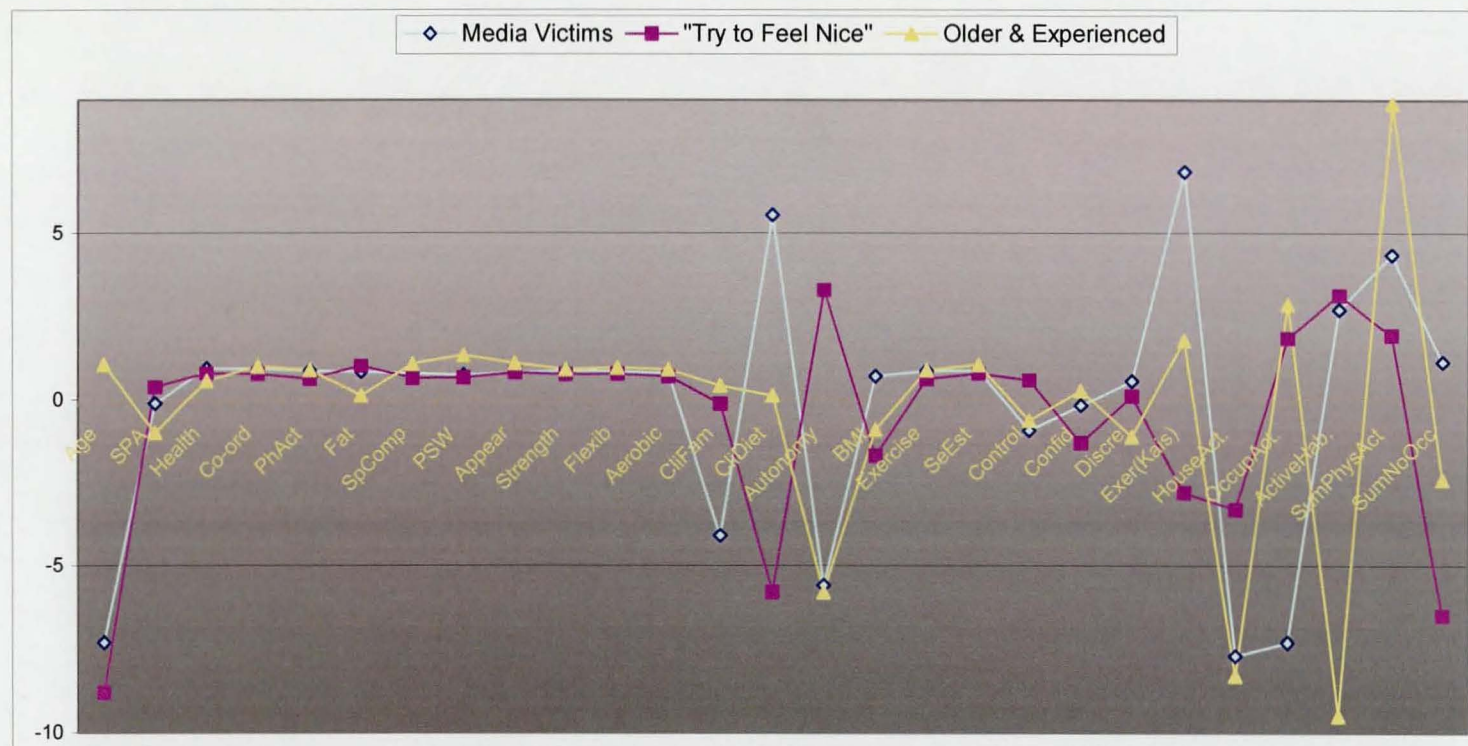


Figure 5.5 Description of clusters for the 2nd data set based on the z-scores of all the examined variables

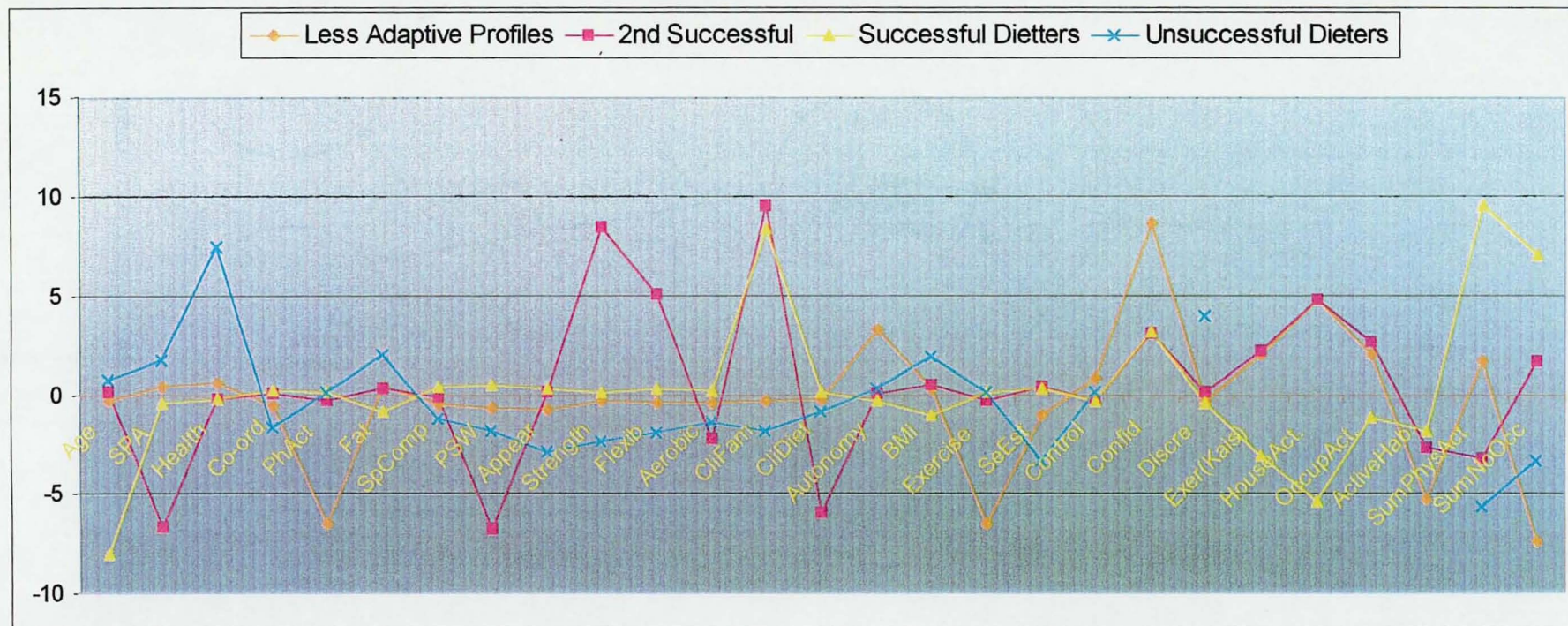


Figure 5.6 Description of clusters for the 3rd data set based on the z-scores of all the examined variables

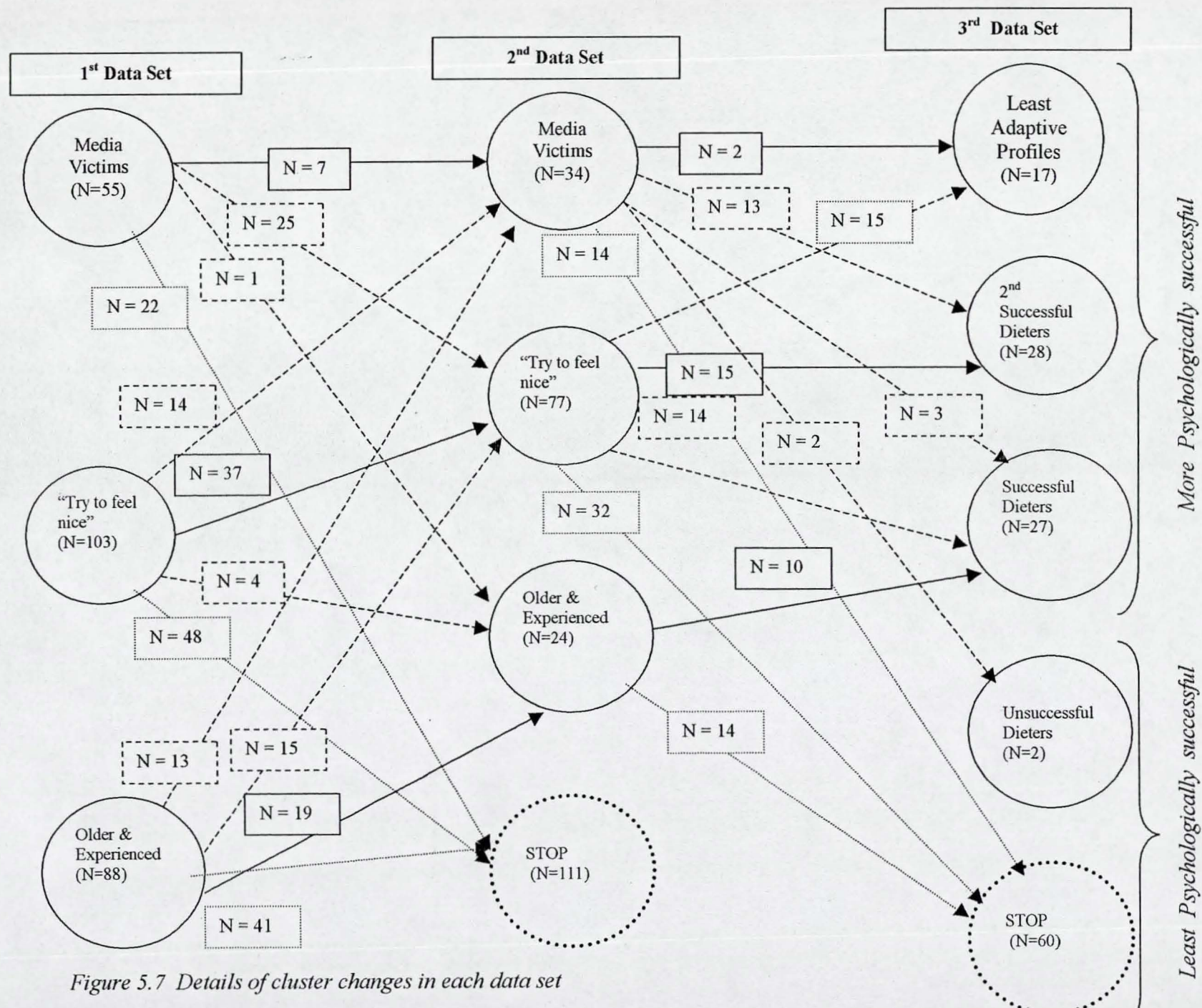


Figure 5.7 Details of cluster changes in each data set

Cluster 1 ("Media victims", 21% of sample, N=55) of the first data set reveals a group of individuals having the highest BMI score ($z = +0.74$), the lowest self-esteem score ($z = -1.29$), the highest control ($z = +0.852$), and the highest discrepancy score ($z = +0.273$). Further, this cluster reveals the lowest Autonomy ($z = -2.6$) the lowest Physical Self Worth (PSW) ($z = -0.85$), the lowest perceived Appearance ($z = -0.74$), and the lowest perceived Strength ($z = -0.43$) scores. Based on these characteristics the individuals in this cluster seem to have internalised the social pressure for a lean physical appearance and they seem to feel quite restricted. For this reason they were labelled as "Media victims" (Figure 5.4). Cluster 2 ("Try to feel nice", 41% of sample, N=104) revealed a group of individuals with the 2nd score in Age ($z = +3.44$), Control ($z = +0.308$) and BMI ($z = +0.192$), the highest score in Self-esteem ($z = +0.47$) but also a high score in Discrepancy ($z = +0.136$). The individuals in this cluster have the highest score in Body Fat ($z = +6.44$) but this is coupled with the highest scores in the Autonomy subscale ($z = +0.15$) and in the Active Habits ($z = +6.0$). Further, this cluster displays middle scores in most subscales of the PSDQ along with the Exercise Habits ($z = -0.10$). As dieters in this cluster seem to display controversial characteristics, according to the already discussed *theory of self-esteem formation*, these individuals seem to "try to feel nice" with their physical appearance. They present also autonomy reasons for doing this particular behaviour (Figure 5.4). Individuals in cluster 3 ("Older and experienced", 34% of the sample, N=88) of the 1st data set are the older in age ($z = +6.27$), while having the lowest score in BMI ($z = -0.67$) and the 2nd score in Self-esteem ($z = +0.209$). They also present the lowest scores in Control ($z = -0.892$) and Discrepancy ($z = -0.273$). These individuals in the same way present positive scores in Fat (lowest score, $z = -0.56$), PSW (highest score, $z = +0.29$), perceived Appearance (highest score, $z = +0.24$), perceived Strength (highest score, $z = +8.8$), and Confidence in achieving the diet goals (highest score, $z = +8.9$). Further, they display the second score in Autonomy ($z = -0.16$) and the highest score in Occupation Activity ($z = +8.71$). With all the previous scores in the examined variables, dieters in this cluster could be labelled "older and experienced" in relation to their dieting behaviour, while they display consistently the most positive psychological profile (Figure 5.4).

Based on the cluster solution of the 2nd data set, three clusters were formed on the basis of the same (four) variables previously discussed. Clusters were named in the same way as the clusters previously presented (Figure 5.2). Differences were found in all 3 clusters with the most significant witnessed in the 1st cluster ("Media Victims") were self-esteem and control scores were reversed leaving BMI and discrepancy scores unaffected. In the 2nd cluster ("Try to feel nice") even if BMI scores were reduced the scores in all the other variables remained unaffected. Scores of the 3rd cluster ("Older and experienced") showed the same adaptive pattern as in the 1st data set. Standardised scores of all the examined variables in relation to the three identified clusters in this data set are displayed in Figure 5.5.

Cluster solution of the 3rd data set revealed 4 clusters that were named again based on the scores of the 4 variables used in cluster analysis (Figure 5.3). In this way, the first cluster was named "Less adaptive profile," as it displayed the highest control scores and the second lowest self-esteem score. BMI and discrepancy scores did not differ much from the scores of the 2 most psychologically adaptive clusters.

The second cluster was named "Second successful dieters" as self-esteem and control scores were almost identical as the ones of the most psychologically adaptive (third) cluster. Nevertheless, the scores of BMI and discrepancy differentiated this cluster from the next cluster ("Successful dieters") which was the most adaptive, as it displayed the most positive scores in all the four variables.

Conversely, scores revealed by the 4th cluster ("Unsuccessful dieters") were the least adaptive, displaying the highest BMI and discrepancy scores coupled with the lowest self-esteem score in comparison to the other clusters. Standardised scores of all the examined variables in relation to the four identified clusters in this data set are displayed in Figure 5.6.

5.3.5.2 Cluster Changes

Table 5.7 and Figure 5.7 display the way dieters changed clusters across the whole duration of the study. Certain trends can be seen such as:

a) There seem to exist groups of dieters with stable psychological characteristics as the same individuals are included in the same clusters (2nd and 3rd clusters). b) Most changes took place between the dieters of the (initial) 1st and 2nd clusters. This trend

differentiates dieters of cluster 3 from the other dieters of the sample. c) Initial cluster 1 included dieters finally clustered in clusters 1 and 4 that were the least adaptive ones (with the exception of 4 dieters). And d) Initial cluster 3 included dieters that were finally clustered in the most adaptive cluster (cluster 3) (with the exception of 6 individuals). Thus, it seems that a certain pattern of psychological characteristics could differentiate those who diet and stable cluster solutions can be displayed with the help of the four variables used in the cluster analysis of the current study.

| 1st Data Set (N= 247, Missing N= 9) | 2 nd Data Set (N= 136, Missing N = 120) | 3 rd Data Set (N= 75, Missing N= 181) |
|--|---|---|
| <i>Cluster 1 (classified in the 1st data set)</i> | | |
| 22 individuals <u>stopped</u> | | |
| 3 individuals → | Cluster 1 → | Stopped |
| 6 individuals → | Cluster 2 → | Stopped |
| 1 individual → | Cluster 1 → | Cluster 1 |
| 15 individuals → | Cluster 2 → | Cluster 1 |
| 1 individual → | Cluster 1 → | Cluster 2 |
| 3 individuals → | Cluster 2 → | 2 ind. Cluster 2 & 1 ind. Cluster 3 |
| 1 individual → | Cluster 3 → | Cluster 3 |
| 2 individuals → | Cluster 1 → | Cluster 4 |
| <i>Cluster 2 (classified in the 1st data set)</i> | | |
| 48 individuals <u>stopped</u> | | |
| 5 individuals → | Cluster 1 → | Stopped |
| 18 individuals → | Cluster 2 → | Stopped |
| 4 individuals → | Cluster 3 → | Stopped |
| 9 individuals → | Cluster 1 → | Cluster 2 |
| 11 individuals → | Cluster 2 → | Cluster 2 |
| 8 individuals → | Cluster 2 → | Cluster 3 |
| <i>Cluster 3 (classified in the 1st data set)</i> | | |
| 41 individuals <u>stopped</u> | | |
| 6 individuals → | Cluster 1 → | Stopped |
| 8 individuals → | Cluster 2 → | Stopped |
| 10 individuals → | Cluster 3 → | Stopped |
| 1 individual → | Cluster 1 → | Cluster 1 |
| 3 individuals → | Cluster 1 → | Cluster 2 |
| 2 individuals → | Cluster 2 → | Cluster 2 |
| 3 individuals → | Cluster 1 → | Cluster 3 |
| 5 individuals → | Cluster 2 → | Cluster 3 |
| 9 individuals → | Cluster 3 → | Cluster 3 |

Table 5.7 Details of cluster changes in each data set.

5.4 Discussion

Cluster analysis is the only multivariate statistic technique that does not estimate the variant empirically but uses the variant as specified by the researcher. In this way, researcher's definitions of variants are a critical step in cluster analysis trying to explore how one can classify certain objects in the data (Hair & Black, 2000).

Using the theoretical definitions of *SDT* (Deci & Ryan, 1985) and *Self-esteem formation* (Fox, 1997; March, 1997; Sonstroem, 1997b) proved fruitful as dieters were successfully classified in clusters over a period of 4 to 6 months. Nevertheless, certain points should be emphasised as dieting is related to one of the most central of human behaviours. In every culture and religion food relates to certain cognitive, affective and behavioural functions (Albright & Stern, 1995). Any new findings related to the psychological determinants of body weight can add vital information to the already established knowledge of the neurobiology of appetite and satiety (Bouchard & Bray, 1996).

High attrition rates are among the first conclusions looking at the results of the current study. More than 60% attrition in six months represents a significant rate for any health behaviour and an alarming number. This rate requires a separate study to examine its causes.

Autonomy reasons for dieting added confusion to the results of this study. One possible reason is the indirect conduct of the researchers with the dieters (through dieticians) which may have left room for social desirability to intervene as a mediating variable. Possibly, dieters were concerned with giving personally-valued reasons for dieting or tried to please dieticians by reporting more self-determined dieting motives. In the same way, high autonomy scores may signify the dieters' need to feel autonomous in a highly controlling context, where they give reasons for not losing the weight they were expected to lose or not reaching the goals set by external agents. These may be some of the reasons why *autonomy* failed to cluster dieters in the current study. Ways for overcoming this problem need to be found to assess more accurately dieting motives.

Conversely, controlling dieting reasons were proved efficient in clustering individuals among adaptive and less adaptive motivational patterns. The fact that high BMI along with low self-esteem scores were found related to the more controlling

reasons for dieting in all 3 data sets is a confirmation of the initial hypotheses of this study that were based on the premises of *SDT*. Thus, this study provided support to the notion that professionals in health-promoting positions should try to lead individuals to more *self-determined* dieting motives in order to guide them safely to a successful long-term weight management.

Various researchers claiming that media messages play a major role on dieting efforts (i.e. Davis, 1997) were confirmed by the results of this study. Body Mass Index scores showed that dieting behaviour relates not only to overweight and obese individuals, but also to individuals with normal BMI scores. Further, Self-esteem and "Discrepancy" scores clustered dieters successfully in all data collection periods, denoting the significance of the difference between the *ideal* and *real* physiques. Both of these results signify the need to promote "healthy" instead of "lean" physiques.

Physical activity scores showed that individuals participating in the current study had lower "Occupation" and "Overall Physical Activity" scores in comparison to the samples in the United States, presented by Sternfeld and colleagues (Ainsworth et al., 2000; Sternfeld et al., 1999). Possible reasons may relate to dieting behaviour, ethnic origin, BMI scores and/or educational level. Further research is needed in order to highlight possible cultural differences and to understand better physical activity scores among dieters.

It seems that body size plays a significant role in PA participation. In the current study body size expressed by BMI scores discriminated participation in exercise and sporting activities as well as overall energy expenditure. Although causality between high BMI scores and low levels of physical activity rates has not yet been supported, the opposite has been proposed as a cause of weight gain by many researchers (Jebb & Moore, 1999; Williamson et al., 1993). More rigorous study designs, research methods, and statistical analyses are needed in order to draw conclusions for the potential link between body size and physical activity as a means to guide future interventions with increased efficiency.

The current study supported the fact that BMI scores are related to differences in various psychological variables. Increased BMI scores are not only related to lower self-esteem but also to lower scores in many self-descriptions. These results give support to

the potential disorganisation of the appetite, based on the proposed bio-psychological system that underlies the control of feeding behaviour while dieting (Blundell, 1995). Adverse psychological variables may hinder the effort to control body weight, especially in the case of dieters with large physiques. Studies should focus on the modification of these negative cognitions, beliefs, attributes and mood states, aiming towards more adaptive psychological profiles during dieting.

Based on the results of this study, less than 30% of the initial sample can be considered as having an adaptive psychological profile when terminating dieting efforts based on the extracted clusters of each data collection. This finding clearly calls for a shift in judging the outcome of a diet, as dieters need to feel more successful at the end of the treatment. Personally valued and accessible goals, agreed to at the very beginning of the treatment, may be the answer to more positive psychological profiles at the end of the treatment.

The previous finding gives also support to the proponents of a shift from the current weight management paradigm to an alternative paradigm that proposes 'self-acceptance', physical activity and normal eating patterns, relying on the internal cues of hunger and satiety. With an ultimate goal to live a fulfilled and healthy life, in the current body shape and size, the successful diet completion becomes easier and controlled (McFarlane, Polivy, & McCabe, 1999; Robison, 1997). Variables related to the environmental influences of behaviour (i.e. family climate), could be introduced in order to explain dieting motives better. Further, examining the predisposition of using autonomous versus controlling reasons in dieting behaviour, is a step forward from the current study. Nevertheless, caution should be observed with factors influencing the assessment of diet variables. Contacting dieters in every-day life conditions may prove to be difficult, as dieting targets central characteristics of the self (i.e. physical appearance). Clustering longitudinally dieters proved prolific as the current field study provided clues towards explaining a behaviour performed by millions in developed countries of the modern world.

6. Summary and Conclusions

The main purpose of this thesis was to examine the impact of the four types of external regulation (Deci & Ryan, 1985) on physical and global self-esteem in the health promotion settings of exercise, counselling and weight regulation. Having this aim, 3 studies were attempted each one with a different method.

The first study was a field (cross-sectional) research where SDT (Deci & Ryan, 1985) and Goal Orientations Theory, (Nicholls, 1989) were examined for their relation with physical self-worth. Results supported the mediating role of SDT in the relationship between goal orientations and Physical Self-worth. In addition, physical self ratings were found related to self-determined and self-referenced exercise behaviour.

In the second study the effects of an autonomous versus a controlling counselling environment were examined in a single-case controlled trial. Two types of feedback were used while examining the changing pattern of various psychological variables, exercise and eating behaviours. Results supported the positive influence of an autonomous environment on various psychological constructs and physical activity for the particular individual. Subsequently, this study indicated that an autonomous environment may enhance physical self, well being, and -hence- self-esteem ratings in counselling settings.

The purpose of the final study was to cluster longitudinally individuals attending a weight regulation programme. Controlling motives, discrepancy between the ideal and current physique, self-esteem and BMI clustered individuals successfully. The need for a shift towards more autonomous ways of body weight regulation was evident. The importance of physical and global self was supported in the weight regulation setting. Less control of behaviour by external agents was related to improved physical and global self-esteem in weight regulation settings.

Based on the review of this thesis a number of researchers supported the positive change of various self-ratings during psycho-educational and physical exercise interventions. Findings of the current thesis supported this result. In more detail, the small positive strength of association supporting the experimental studies aiming to influence self-perceptions was sustained by the results of the 2nd study where the intervention provided a limited positive effect on self-esteem ratings. Nevertheless, results on physical self provided a higher positive impact of the intervention during and after the end of the same study.

A medium/negative association of self-esteem with dieting and increased BMI scores proposed in the examination of the longitudinal studies of the review was supported in the findings of the 3rd study. In the same venue, enhanced self-esteem scores with the successful completion of a dieting program were supported in the clusters of the most successful dieters at the end of the same study.

Conclusions on the regulation of behaviour in the 3 examined contexts suggest that:

- The assumptions of *SDT* (Deci & Ryan, 1985) were supported as the quest for autonomy was related with the enhancement of both *self-esteem* and *physical self* in most of the examined contexts. Thus, this theory seems to explain the *executive aspect* of the self, or else, how "*the self is the controller of controlled processes*" (Baumeister, 1999, p.12).
- Gratifying the need for *autonomy* in the particular individual (2nd study) was found important not only for the continuity of the behaviour in focus but also for achieving adaptive psychological profiles.
- The relationship between *SDT* (Deci & Ryan, 1985) and *Goal Orientation Theory* (Nicholls, 1989) was confirmed since *identified* and *integrated* regulation were found related to *task* goal orientation and *external* regulation to *ego* orientation.
- Reasons for engaging in the 3 health promotion settings were successfully assessed by the Self-determination continuum and the autonomy and controlling motives and feedback. In more detail:

A. *SDT* (Deci and Ryan, 1985) seems to be able to explain the participation reasons in four exercise activities. Differentiation between *extrinsic* and *intrinsic* motives based on the *self-determination continuum* reflects the motivating reasons within the exercise context.

B. *Autonomy* and *controlling* feedback fostered and delayed respectively, the effects of a behavioural counselling on individuals aiming to improve their physique in a dieting and exercise promotion setting. In more detail, through an experimental manipulation of three counselling conditions the individual participating in the *autonomy condition* showed the most adaptive profile. Counselling the particular individual provided the most rapid positive changes in most of the psychological variables and the most frequent exercise

participation. Intervention supported the positive influence of the autonomous environment on this individual as it demonstrated longer positive changes in exercise participation, since physical activity improvements were still valid 5 months after the end of the treatment. Further, intervention provided clues about our ability to influence physical self-ratings for both *autonomy* and *non self-determined conditions* in the case of the particular individuals. Nevertheless, changes were more rapid in the individual participating in the *autonomy support condition*. This study highlighted the need for adapting scales capable of addressing minor changes occurring on an individualised level in a short period of time.

And C. *Controlling* motives for weight reduction were related to the least adaptive psychological profiles during a 6-month period. Adversely, weight regulation efforts can be more successful within an *autonomous* climate.

- The predisposition of using *autonomous* versus *controlling* motives, as well as, a better assessment of utilising *autonomous* versus *controlling* reasons in exercising and dieting behaviour are some of the ways of improving the current thesis.

Conclusions on *physical* and *global self-esteem* suggest that:

- *Physical self* can be influenced by both *identified* and *integrated* regulation of behaviour.
- For positive changes to emerge in both *global* and *physical self* we need specialised interventions. Results of the *systematic review* showed that small positive changes in self-perceptions are feasible through various interventions.
- We need longer intervention periods (than 12 weeks) for influencing *self-esteem ratings*. Future attempts to modify various psychological factors in obese or overweight individuals should last longer. In the same manner, we need longer intervention periods for the increased frequency of physical activity participation to endure.
- External-referenced criteria of success –or else *ego orientation*– do not influence *physical self-perceptions* easily.
- *Physical self* is an important psychological construct influencing self-esteem and well being. In the same venue, discrepancy between the ideal and current physique influences the level of physical self. Controlling motives seem to moderate this relationship.

Evidence on *exercise* and *physical activity* suggest that:

- When exercising, *identified* and *integrated* motives can foster participation motives (through elevated *physical self*) (Sonstroem, 1997).
- *Physical activity* can be successfully promoted through counselling. Simple forms of physical activity (i.e., walking) can fit easily in everyday life of overweight and obese individuals.
- *Physical activity* is important for the reduction of *Social Physique Anxiety* in overweight and obese individuals.
- Dieters with increased *physical activity* participation seem to be included in the most psychologically adaptive clusters.

Conclusions on body weight regulation suggest that:

- Dieting individuals with low *BMI* scores are more physically active than their counterparts with larger physiques.
- High attrition rates among dieters and the fact that 7 out of 10 dieting individuals were clustered in the least adaptive profiles 6 months after the beginning of the dieting programme, indicates their need for encouragement and motivation. Dieters need to feel more successful and this can be accomplished either with lower and more feasible goals or with new criteria of attainment (i.e., health indicators).
- Findings support the existence of adverse psychological states while trying to regulate body weight, especially in the case of dieters with large physiques.

Some ways forward from the current thesis are primarily to explore the consequences of control motives in the health behaviours of exercise and weight regulation. An example of such an exploration is whether the connection between control motives and lower self-esteem scores, proposed in the current thesis, is a trend that can be generalised in other health promotion settings.

As previously discussed evidence from the current thesis proposed the existence of adverse psychological states during weight regulation efforts. Future studies need to clarify this finding and explore the conditions in which these adverse psychological states emerge. A shift in dieting policy may be a solution to the problem of weight regulation, as promoting self-acceptance, physical activity and normal eating patterns have been connected to adaptive psychological states. In the same venue, findings on improved

body image of obese individuals during and after the end of the intervention in the current study need to be examined thoroughly trying to generalise them in other settings and individuals.

The *general conclusion* of the thesis is that human *autonomy* can be considered both a basis for self-esteem advancement and an important motivating factor in many contexts relating to health promoting behaviours. Directing human behaviour towards the gratification of the need for *autonomy* could be the cornerstone of a successful behaviour internalisation, leading to a healthier and happier life.

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Appendix

(1): *World Health Organisation (WHO)* defined health as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. With this definition people can not be healthy in the absence of ideal social, political, or economic conditions. Nor can be considered healthy until they have been able to love, to work, and to create. This kind of definition holds a great appeal for the proponents of an environment that helps people become fully functioning human beings (Sheridan & Radmacher, 1991)

(2): Recent Greek epidemiological data suggest that only 10% of males and 7% of females are currently participating in any form of exercise or sporting activity, 20% of males and 15% of females are obese (50% of males and 28% females are overweight) for the age group of 25 to 35, and, more than 60% of males and 40% of females are smoking from the age of 25 or younger (Trichopoulou, 2002).

(3): *Self-efficacy* can be defined as the self's belief that it can produce the optimal or requisite responses in particular tasks. Expectations of personal efficacy are derived from four principal sources of information: Performance accomplishments, vicarious experience, verbal persuasion, and physiological states (Bandura, 1977).

(4): *Protocol* for the review of literature

Interventions for changing various self-perceptions

BACKGROUND

Self-esteem, is one of the most studied individual differences in personality over the last decades, due to the belief that its low ratings are responsible for the lack of a clear, stable and consistent understanding of one's self (Campbell, 1990). Further, self-esteem is a psychological construct that serves both as an outcome and as a mediating

variable of human function and behaviour, (Sonstroem, 1997). Recently, self-esteem has been recognised as one of the most important factors for quality of life and psychological well-being. High self-esteem is associated with greater persistence facing failure, and greater resilience (Strauger & Rosenberg, 1970). Adversely, low self-esteem relates to greater vulnerability to negative everyday events, wide mood swings and affective reactions (Campbell, Chew, & Scratchley, 1991).

Theoretical developments have emphasised the multidimensional nature of self-esteem and its components. These components are constructed by personal characteristics, competencies, attitudes and roles, and they may involve various 'sub-selves' such as the *family-self*, the *working-self*, the *social-self* and the *physical self* (Fox, 2000a). One of these components, the *physical self*, has been repeatedly proposed as having great importance for global self-worth (Fox, 2000; Sonstroem, 1997). Evidence concerning the importance of physical ratings of the self and self-esteem has been provided by correlational studies that have indicated a strong correlation ($r = .6-.8$) between these two constructs (Fox, 2000a).

Further, studies of the physical self have shown associations with life adjustment as measured by mood, depression, and reported physical and psychological health. Research has provided support for the notion that certain groups report lower levels of physical self due to cultural or developmental reasons. Obese and overweight individuals formulate such a group. A way to oppose this trend relates to continual support in every aspect of one's life for a successful application of weight regulation regimen contributing to a "lifelong treatment" of the predisposition to conserve energy. This "lifelong treatment" relates also to school interventions as the individuals most at risk for developing excess body fat and eating disturbances are school-age people. Three factors give support to the studies aiming to foster self-esteem in these children: A) Criticism and social exclusion due to increased weight elicit feelings of shame that undermine social functioning from a very early age (Cahnman, 1968; Dejong, 1980). B) Efforts to control body weight are blamed for the development of eating disorders (Cooper, 1995) contributing to the multi-factorial explanation of such chronic disorders. And C) High prevalence of dieting among the female adolescent population highlights the need for educational programmes aimed at prevention and intervention.

Characteristics of programmes aiming to foster both self-esteem and physical self, contain educational and psychological elements (Robinson & Bacon, 1996). Educating individuals is important for changing beliefs about their bodies, through the examination and change of many negative social stereotypes. Educational means are also used for changing attitudes and beliefs about attractiveness, and also, for encouraging physical exercise trying to improve physical and mental health. Psychological techniques eliciting positive changes of self-esteem relate to assertiveness training, cognitive restructuring, imagery and relaxation training (Robinson & Bacon, 1996).

As the development of physical skills and competencies can be achieved through participation to sport and exercise, the potential effects of exercise involvement on *physical self* and global self-esteem should be clear. Many health professionals are becoming increasingly interested in the potential of exercise to improve mental well-being and to treat mental disorders. For this reason exercise programmes are attracting the interest of researchers and health specialists. Summarizing the effects of exercise programmes on self-esteem, Sonstroem (1996) and Fox (2000b) argued that exercise programmes increase self-esteem scores.

Until recently, research findings examining the effects of various programmes on self-perceptions, a) were based on both psycho-educational and physical exercise programmes, b) relied on uni-dimensional instruments that do not take advantage of the recent theoretical and measurement advances regarding self-perceptions, and c) were relied on certain populations (i.e., college samples).

OBJECTIVES

The purpose of this chapter is to provide a systematic review of studies that have examined either experimentally or longitudinally the effects of exercise and psycho-educational programmes on self-perceptions. If sufficient trials and longitudinal studies existed, the following secondary objectives were explored:

- Were certain types of exercise activities (i.e. individual v group activities) or psycho-educational programs (i.e. school based v other specially formulated contexts) more effective in changing self-perceptions than others?
- Did either duration or frequency of stimuli influence the impact of the interventions on self-perceptions?
- Did choosing freely to participate in a certain exercise activity make any difference on the changing patterns of self-perceptions?
- Have researchers examined the short-term (i.e. < 3 months from interventions) or the long-term effects of the performed interventions (i.e. > 12 months from interventions)?
- Were interventions more successful with particular participant groups (i.e. men v women)
- Were any particular groups more frequently examined than others were?
- Were there any trends supported in the longitudinal examination of self-perceptions?

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

The inclusion criteria for this review were:

- a) Studies had to follow either an experimental or a longitudinal methodology;
- b) Both physical exercise and psycho-educational studies were examined ,
- c) Studies published in the last 5 years (1996 onwards) were included in this review;
- d) Published articles in the English language were used.

Types of participants

As an increased level of self-perceptions is central for an adaptive psychological profile of every individual, studies examining all groups of participants (i.e. physically healthy and unhealthy) were included in this review.

Types of intervention

Interventions examining the effectiveness of various psycho-educational programs with a no intervention group and/or with a traditional weight regulation program were included. Further, studies dealing with the effects of various physical exercise programs with a no exercise and/or with the effects of traditional physical exercise programs (i.e. P.E. classes) were examined.

Types of outcome measures

Outcomes of interventions are measured with the help of various scales of self-perceptions. In this review these scales were defined in terms of uni- v multi-dimensionality of self-esteem, self-worth, and/or body image measurement.

SEARCH STRATEGY FOR IDENTIFICATION OF STUDIES

The following sources were included in the literature search: MEDLINE, PSYCHLIT, BIDS, and SPORTDISCUS . All databases were searched for the records of 1996 to date. The search strategy below was used in most of the included databases:

1. Physical activity
2. Exercise
3. Aerobic
4. Self-esteem
5. 4 & Self-worth
6. 5 & Body-image
7. 6 & Physical self
8. 1 & 7
9. 2 & 7
10. 3 & 7

11. Education & 7
12. Psycho & 7
13. Intervention & 11
14. Intervention & 12
15. Meta-analysis & 7
16. Longitudinal & 7

Articles were excluded if they had of the following criteria:

- a) Unpublished articles, conference papers, dissertations, qualitative studies, and studies in languages other than English. Most cases these studies do not include enough data on group differences to calculate accurately effect sizes;
- b) Cross-sectional studies; and
- c) Studies published before 1996.

METHODS OF THE REVIEW

The significance test for each study was measured by the equation:

Significance Test = Effect Size x Study Size.

The effect size of each intervention was measured with the help of various formulas depending on the test statistics used in each study (t , F , χ^2 or Z). Examples of computing effect sizes (r) through t and F statistics are (Rosenthal & DiMatteo, 2001).

$$r = \sqrt{\frac{t^2}{t^2 + d}}$$

$$r = \sqrt{\frac{F}{F + d_{\text{error}}}}$$

Strengths of association were computed with the help of Table 2.1 (see text).

The quality of each study was evaluated based on the inclusion criteria. Where it was unclear whether a criterion was met, additional information was obtained from the authors.

A summary of each study was provided (Tables 2.2, 2.3, and 2.4) giving information about the authors, date of publication, subjects, groups, treatment, instruments, results, and limitation(s) of the study.

(5): The *contents* of the 12 counselling sessions for the “autonomy” and the “non self-determined” conditions were the following:

1st session:

(Based on Precontemplation)

Welcoming session. Explanation of the purposes and the techniques that were going to be used in the programme. Orientation of the individual's problem. Outlining the purposes and the steps of the intervention programme. Exploring the person's defences, and self-assessment of using these kinds of defences in the problem behaviour. Discussion on what these defences meant and how to improve their application in the person's life. Exploration of the individual's history of eating and exercise behaviour. Discussion of ways to seek help from important others.

2nd session:

Functional analysis of the individual's eating behaviour. Application of social liberation techniques.

(Based on Contemplation)

Conscious raising techniques: Questions and answers about food and exercise (calories intake and calories expenditure). Defined specific goals of action and terms of measuring them. Discussion on the health effects of obesity, as well as, on health benefits of physical activity (in order to improve self-realisation). Pros and Cons assessment of behaviour change

3rd session:

Discussion of the antecedents of the problem behaviour (awareness training). Self-re-evaluation in terms of personal values using certain techniques - and assessment.

(Based on Preparation)

Scheduling life around changing and what had to be done in order for this change to take place. What needed to be considered in order for someone to commit herself to the changing direction (and assessment). Balance sheet regarding the pros and cons of the changing decision.

4th session:

Assertiveness training, weight control and exercise behaviour. Decisions on action steps. Role playing of action scenarios.

5th Session

(Based on Action)

Information about the variety of activities to do instead of eating. Information about exercise activities and how they could help her. Exploration of exercise history and exercise barriers. Exploring new ways of performance improvement. Getting familiar with the exercise related terms. Creating new points of interest for maximum health benefits. Putting exercise sessions within the individual's everyday schedule. Goal setting regarding exercise activities. Contracting on exercise and dieting decisions. Guidelines for an effective exercise programme.

6th session:

Walk/talk session where the individual chose the place, the intensity and the duration (autonomy condition). Discussion of the social relationships and their influences related to exercise. Comments and questions about the counselling procedure until know. Understanding the revitalising nature of exercise: Discussion of the underline mechanisms related to the psycho-physiological effects of exercise. Discussion of issues concerning the practicality of the exercise sessions, as well as, the exercise setting and exercise cloths.

7th session:

Analysis of the individual's rewarding system. Identification of food related rewards. Creation of an alternative reward system. Construction of a reward contract based on the individual's needs.

8th session:

Discussion of ways to help the individual's relationships. (1. teaching how Empathy & Warmth works and how they can influence others' attitudes, & 2. List of do's and don'ts to prepare helpers to help). Analysis of the supporting system of the individual (what do you expect, by whom etc.). Emphasis on a better understanding of the available social support system.

9th session:

Check on the progress of goal rewards, contracts and relationships.
Discussion of issues related to environment (cues control). Proposals as to how to overcome special situations. Assessment of the abilities to control environment.

10th session:

Teaching a relaxation technique and explaining how relaxation can be useful in everyday life. Thoughts control: Retraining mind in order to think in a more positive way. Discussion of the results of applying assertiveness training.

11th and 12th session:

Assessing the results of relapse to previous behaviour. Discussion of the consequences. Discussion of the high risk situations for relapse. Environment control through situations and cues control. Self-efficacy assessment on these high risk situations. Review of the techniques already presented and discussion of the impact they had on individual's life.

