

The Social Impacts of Sport and Physical Recreation

An Annotated Bibliography

Prepared on behalf of the Recreation and Sport Industry Statistical Group

**Prepared by the National Centre for Culture and Recreation Statistics
Australian Bureau of Statistics**

May 2001

Contents

1. Introduction

2. How to Use This Bibliography

3. Australian and New Zealand References

4. International References

5. Index

1. Introduction

The positive impact of participation in sport and active recreation on physical health is now well accepted. Research has identified a wide range of sport-induced health benefits including improving cardiovascular health and assisting in the development of strength and balance. In light of this, governments at all levels have become increasingly active in encouraging people to adopt physical activities as a regular part of their lifestyle. In contrast, much less is known about the social impact of sport and physical recreation and, in recent years, there has been an increasing focus on, and interest in, identifying such impacts.

This bibliography presents details of recent articles, reports and other publications which describe applied research on the social impacts of sport and active recreation. There is a specific focus on articles which present empirical evidence. Major literature reviews describing recent research in this area are also included. The bibliography includes both Australian and international references, and focuses primarily on material dated 1990 onwards. An attempt has been made to include all Australian and New Zealand articles from this period which present evidence of the social impacts of sport and active recreation. Internationally, a much larger body of research on this topic is available, particularly from the United States of America. Here an attempt has been made to summarise the research conducted overseas by including in the bibliography key articles and reviews from outside Australia and New Zealand. Those overseas articles selected for inclusion are primarily comprehensive literature reviews or articles which present evidence from some of the better examples of empirical research in this area.

For each reference a range of summary information is presented including the author's abstract (if available) and details of the social impact(s) investigated, the focus population(s), the methodology employed and the country in which the research took place. In addition, to further assist users of the bibliography in gaining an appreciation of the available evidence, the NCCRS has prepared 'additional comments' about each study. The additional comments include further information about the content of each publication, an evaluation of the methods employed and a discussion of the conclusions drawn.

The bibliography has been produced by the National Centre for Culture and Recreation Statistics (NCCRS) on behalf of the Standing Committee on Recreation and Sport (SCORS). NCCRS hopes to update this bibliography on a regular basis. To assist with this, NCCRS welcomes the contribution of users of this bibliography and is seeking details of articles and reports relating to other relevant research on the social impacts of sport and active recreation.

2. How to Use This Bibliography

The references in this bibliography have been grouped under two broad headings: Australian and New Zealand References; and International References. It should be noted that when a reference could be categorised under more than one heading, it has been included under the most appropriate heading. All references within the one category are listed in alphabetical order. An index has been provided at the end of the bibliography to assist in finding references that relate to specific social impacts.

Each entry contains the following information:

1. Reference Details (e.g. author(s), date of publication, title, etc.)
2. Summary Information:
 - Impact: A description of the social impact(s) discussed in the reference
 - Population: The specific population(s) on which the study focuses
 - Methodology: In the case of articles describing empirical research, a brief description of how the research was conducted; also notes whether the article in question is a literature review
 - Country: The country in which the research was conducted or, in the case of literature reviews, from where the literature is sourced
3. Author's Abstract (if available)
4. Additional Comments: Further details of reference contents, an evaluation of the methodology used and a discussion of the conclusions drawn.

In this bibliography, a relatively broad definition of 'social impact' is used which includes outcomes impacting on either the individual or on society in general. The studies included in this bibliography have been categorised to one or more of eight social impact categories. The categories used and the type of studies included in each are as follows:

- **Community Pride/Identity**
Used in the case of references which discuss the role of sport at the broad level as a source of definition and identity for large groups of people.
- **Crime Prevention**
Used in the case of references which investigate the association between sports participation and crime, from 'minor' offences such as vandalism to 'more serious' offences such as theft and criminal violence. Most such references in this bibliography focus on youth crime.
- **Development of Life Skills**
Describes references which discuss the links between sports participation and the acquiring of skills which are of assistance to individuals in day-to-day life including social skills and self-efficacy. Also includes references which investigate the impact of sport in relation to the maintenance (rather than the development) of life skills, such as problem solving, particularly amongst the aged population.
- **Mood**
Describes references which discuss the impact of sports participation on aspects of mental health, specifically those related to mood such as depression, anxiety and stress.

- **Personal Well-Being**

Used in the case of references which discuss the benefits of sports participation on general 'quality of life'. In most such references, the primary focus is on aspects of physical health, and findings on social impacts are generally related back to physical health outcomes.

- **Self-Esteem**

Describes references which discuss the impact of sports participation on self-image and self-confidence.

- **Social Behaviour**

Used to describe references which discuss the role of sport in areas relating to social interaction, such as the development of social skills amongst particular groups and the reduction of anti-social behaviour (except crime). Also includes references which focus on the role of sport in tobacco and alcohol consumption.

- **Social Cohesion**

Describes studies that examine the impacts of participation at the society (rather than the individual) level, specifically on the association between sport and social integration. Includes references which portray sport as a 'social lubricant' which assists separate social groups to work together.

3. Australian and New Zealand References

i. Begg, D.J., Langley, J.D., Moffitt, T. and Marshall, S.W. (1996) "Sport and Delinquency: An Examination of the Deterrence Hypothesis in a Longitudinal Study", British Journal of Sports Medicine, Vol. 30, pp. 335-341.

Impact:	social behaviour, crime prevention
Population:	adolescents
Methodology:	multivariate quantitative
Country:	NZ

Authors' abstract

Objective - To determine whether involvement in sporting activity in mid-adolescence would deter delinquent behaviour in late adolescence.

Methods - Members of a longitudinal cohort study were interviewed at ages 15 and 18 years old and, among other topics, were asked questions relating to involvement in physical activity and delinquent behaviour. Logistic regression models were used to examine the relation between sports involvement and delinquency at age 15 years and delinquency at age 18 years.

Results - After controlling for delinquent behaviour and psychosocial factors at age 15, females with moderate or high levels of sporting activity, and males with high levels of sporting activity, were significantly more likely to be delinquent at age 18 years than those with low levels of sporting activity. No significant association was found between sporting activity and aggressive behaviour, team sports participation and delinquency, and team sport participation and aggressive behaviour.

Conclusions - This study did not support the deterrence hypothesis and showed that high involvement in sporting activity, but not team sport, was associated with a subsequent increase in delinquent behaviour.

Additional comments

This study is part of the Dunedin Multidisciplinary Health and Development Study (DMHDS); a longitudinal study of health, development, attitudes and behaviour of a group of individuals born at the only obstetric hospital in Dunedin, New Zealand in 1972-1973. Data was collected from 1037 participants at regular intervals from birth. The present study is based on data collected at the age 15 (n = 799) and age 18 (n = 930) assessments.

The primary measures of interest for this study are delinquent behaviour and sporting activity. The Leisure Time Physical Activity Questionnaire, an interviewer administered questionnaire which evaluates energy expenditure on physical activities over the previous 12 months, was administered to all subjects at both the age 15 and age 18 assessments. This information enabled participants to be classified into high, middle, moderate or low groups in relation to levels of participation in physical activities and team sports. A self-reported delinquency measure was also applied at ages 15 and 18 which asked participants about serious illegal acts committed during the previous 12 months. This was used to categorise participants into sex specific delinquent/non-delinquent groups at each age. Data on aggressive behaviour, a subset of the self-reported delinquency scale comprising only those activities deemed to be aggressive, was separately assessed. In addition, a number of psychosocial measures were collected from the Social Competence Index of the DMHDS mental health assessment form, which measured attachment to family and friends, part-time work, involvement in social activities, the extent of social support networks and self perception of strengths. The Family Diversity Index (derived from a number of sociodemographic variables) and a word

recognition test (an indirect measure of educational attainment) were also applied. Logistic Regression Models were used to analyse the data by gender, using delinquency rates at age 15 and psychosocial measures as control factors.

The results of this study indicate that participation in physical activity during early adolescence does not decrease delinquent behaviour in later adolescence. In contrast it was found that males and females with the highest levels of participation in physical activity at 15 years of age reported higher levels of delinquency at 18 years of age. No significant relationships between delinquency or aggressive behaviours and participation in team sports were observed. Despite these results it should be noted that the best predictor of delinquent behaviour at age 18 was delinquent behaviour at age 15, regardless of sporting participation.

ii. Byrne, A. & Byrne, D.G. (1993) "The Effect of Exercise on Depression, Anxiety and Other Mood States: A Review" Journal of Psychosomatic Research, vol. 37, pp. 565-574.

Impact: mood
Population: general population, clinical population
Methodology: literature review
Country: Australia

Authors' abstract

This paper addresses the current literature related to investigations of the link between exercise treatments and depression, anxiety and other mood states. Results from these investigations are supportive of the anti-depressant, anti-anxiety and mood enhancing effects of exercise programs. There were considered to be, however, a number of potential methodological problems in many of the research studies; the nature of these were considered. Finally, some possible directions for future research are outlined.

Additional comments

This report reviews 30 studies dating back to 1975 with a focus on the effect of exercise on mood. More specifically, the benefits of exercise on depression, anxiety and other states of disturbed mood is examined. The review focusses mainly on experimental studies, with 13 non-clinical samples and 17 clinical samples being examined. The majority of studies reviewed involving clinical samples focus on depression while the majority of studies involving non-clinical samples focus on more general measures of mood states. Most studies employed aerobic exercise (which generally increases aerobic capacity) as treatment; however, the impact of non-aerobic exercise on mood is also examined in some cases.

Overall, the report suggests that the research supports the notion that exercise has psychological benefits for participants. The majority (90%) of studies examined both the anti-depressive properties of exercise and the effect of exercise in combating anxiety. In addition, the studies generally substantiate the claim that improved mood is associated with exercise. A non-aerobic activity (weight training) was found to have equally positive effects on the alleviation of depression as an aerobic activity (running) suggesting that positive impacts on mood resulting from exercise may not be dependent on an increase in aerobic capacity.

This review also discusses the methodological problems associated with the studies discussed. Some of the problems identified include the suitability of the measures used, such as the Profile of Moods States (POMS), for non-clinical populations. The authors suggest that such measures have been designed for persons with existing psychological problems and, as such, may be insensitive to psychological changes in non-clinical populations. Comparability of studies was complicated due to the extensive range of assessment instruments used. In addition, the findings of some studies may be limited by the selection of convenience samples, with little consideration of psychological or exercises status, the lack of random assignment to treatment conditions, and in some cases the absence of control groups. A lack of longitudinal or follow-up data in the studies reviewed is also identified. Therefore, no comments could be made on whether the benefits of exercise on mood states or depression were maintained after the cessation of exercise or whether continuing exercise was necessary to maintain these effects. Finally, the authors suggest that the links between improvements in fitness and improvements in mood require more thorough investigation.

iii. Cameron, M. and MacDougall, C. (2000) "Crime Prevention Through Sport and Physical Activity", Australian Institute of Criminology, Trends & Issues in Crime and Criminal Justice, No. 165.

Impact:	crime prevention, social behaviour
Population:	youth-at-risk, indigenous
Methodology:	case study, program evaluation
Country:	Australia, USA, Canada, UK

Authors' abstract

Crime prevention is not the primary objective of sport and physical activity, but it might be an extremely important by-product. This paper examines a variety of sporting activities that appear to have had beneficial effect in helping young people steer away from trouble. It examines wilderness programs, programs in which youths participate and learn skills, and programs in which the sense of belonging reduces vandalism and develops pro-social behaviours.

Of particular interest are sports carnivals in Aboriginal communities. When the carnivals (organised and run by Aborigines for Aborigines) are held, they act as catalysts for social and traditional cohesion. Harmful behaviours such as petrol sniffing, heavy drinking, and violence are prohibited for the duration of the carnival, and the prohibitions hold in the short term.

At another level, elite sporting clubs can reach out into their communities. The example in this paper is the (British) Liverpool Football Club, which has had success in quit smoking programs, coaching, truancy reduction, and even reducing the number of hoax calls to the local fire brigade.

This is the first exploratory paper for a project in conjunction with the Australian Sports Commission. The Australian Institute of Criminology would welcome any comments on this paper, and would like to learn about any activities that may have an implicit or explicit crime prevention outcome.

Additional comments

This report reviews a number of sporting programs that appear to have a beneficial effect on young people, in particular as a means of reducing crime. Some of the programs reviewed in this report include: wilderness therapy programs incorporating physical activity components for at-risk young people; integrating homeless youth through sport; the Canadian Participate and Learn Skills program; community involvement of sporting clubs; and Aboriginal sports carnivals. These programs attempt to use participation in physical activities, such as judo, swimming and netball, to develop greater social competence in youth-at-risk by helping them to develop new skills, providing alternative stimulation (as a diversion to crime), encouraging a sense of belonging, improving their support networks and broadening their knowledge of services available to them. There are also programs based on promoting and rewarding pro-social behaviour by way of mentoring and role modelling generally using prominent sporting identities within the community.

Overall, the report suggests that these approaches to crime prevention can be successful in preventing crime. Positive outcomes observed for the programs discussed include an immediate drop in the incidence of theft and vandalism, reductions in the propensity to re-offend, and more general benefits such as increasing participant's sense of belonging.

The authors note that many of the existing physical activity programs aimed at youth-at-risk in Australia have not been specifically evaluated in relation to crime prevention outcomes and, consequently, very little is known about their effectiveness in this respect. In addition, while the programs discussed suggest that sport and physical activity programs may result in immediate or short-term crime prevention, the need for follow-up or longitudinal data has been identified to examine if these positive results are sustainable over a longer period of time. While the authors conclude that programs incorporating physical activity can be an effective means of reducing the incidence of crime, it is suggested that such programs should be part of a larger strategy and that they should be designed on a case-by-case basis to meet specific community needs.

iv. Centre for Research, Industry and Strategic Planning (CRISP) (2000) Sport and Recreation in Tasmania, Research Unit, Department of State Development, Hobart, Tasmania.

Impact: personal well-being, social behaviour, crime prevention, community pride/identity
Population: general population
Methodology: literature review
Country: Australia

Author's abstract not provided

Additional comments

This paper discusses 5 key statements that identify the physical and social benefits of sport and recreation in Tasmania. The key statements relating to the social benefits of sport and recreation are: essential to health and well-being (physical and mental); reduces anti-social behaviour (including crime); a community builder; and builds quality of life. The authors suggest that participation in sport and recreation may also result in an eventual financial benefit by lowering the costs of social services, police, justice and incarceration.

The paper briefly describes a number of programs and services which provide support to these key statements; however, little empirical evidence is presented in support of the claims made. This lack of evidence is noted by the authors who suggest this paper should be viewed more as a brief summary of existing information on the social benefit of sport and, in part, an indicator of the direction in which future research may evolve.

v. Coleman, D. and Iso-Ahola, S.E. (1993) "Leisure and Health: The Role of Social Support and Self Determination", Journal of Leisure Research, Vol. 25, No. 2, pp. 111-128.

Impact: personal well-being, mood
Population: general population
Methodology: literature review
Country: Australia, USA

Authors' abstract

This paper reviews the literature on the social context of health to identify the ways in which leisure might contribute to health. Considerable evidence has demonstrated that stressful life circumstances induce physical and mental illnesses. However, this impact has shown to be moderated by various coping processes including leisure participation. The paper argues that leisure participation facilitates coping with life stress in two ways. First, one of the most effective sources of relief from stress has been shown to be the perception that social support is available. Leisure has been demonstrated to be highly social in nature and to facilitate development of friendships. Companionship in shared leisure activity appears to provide effective relief for people as they deal with excesses of daily life stresses. In addition, many leisure experiences have the capacity to provide feelings of support. Second, dispositions reflecting self-determination (e.g. hardiness, locus of control) have also been shown to contribute to people's coping capacities and health. Perceptions of freedom, control, competence and intrinsic motivation that are central to many leisure experiences are believed to induce these stable beliefs in self-determination.

Additional comments

This report discusses the relationship between 'life stress' and poor health and investigates the ability of leisure participation to act as a buffer in this relationship. A number of studies, largely from the 1980s, are reviewed which conclude that leisure participation can result in improvements to health (as defined by the absence of illness). While most of these appear to be focused primarily on active leisure, some appear to consider a broader range of leisure activities. These findings are considered in relation to various studies which investigate the personal outcomes of leisure participation and a number of articles which discuss the psychological factors linking stress and health. The authors conclude that it is primarily the social and self-determination aspects of leisure participation which provide the resources to either avoid the onset of stress or to cope effectively with it before it has an impact on health.

The authors note that higher levels of social support can however have unintended negative outcomes, specifically that excessive social contact can generate stress instead of buffering it. Evidence is provided that suggests that it is not the amount of social contact provided by leisure participation which is the key factor but rather whether a person can predict and control that social interaction. This provides further support to the theory that self-determination, or a feeling of control, is a key factor in the effectiveness of leisure participation as a stress buffer.

The concept of health used in this paper (absence of illness) may limit the conclusions that can be drawn. The authors suggest that other aspects of well-being such as emotional, social and spiritual well-being need to be incorporated into the explanation.

vi. Crossen, K. and Raymore, L.A. (1997) "Body Attitudes and Participation in Physical Activity: Are They Related for Adolescent Females?", New Zealand Journal of Sports Medicine, pp. 42-45.

Impact:	self-esteem
Population:	female adolescents
Methodology:	multivariate quantitative
Country:	New Zealand

Authors' abstract

The present study sought to examine whether attitudes towards the body were related to leisure-time involvement in fourteen types of physical activity for females between the ages of fourteen and seventeen. While previous research has established links between adolescent female body satisfaction and negative outcomes such as eating disorders, the nature of the relationship between body satisfaction and participation in physical activity is yet to be determined; different authors have found different types of relationships. A sample of 266 female Christchurch adolescents completed a self-administered questionnaire that examined involvement in physical activity and body attitudes as measured by the Body Attitude Questionnaire. The results suggested that perceptions of fitness and strength were related to the largest number of physical activities. Females who were highly involved in running and athletics/harriers indicated negative body attitudes on the largest number of dimensions.

Additional comments

A sample of 266 female adolescents ranging in age from 14-17 years (mean = 15.22 years) was included in this study. All were students in the fifth form at one of three Christchurch schools: a private single sex school, a public single sex school and a coeducational public school.

All participants completed the Body Attitudes Questionnaire (BAQ) which includes 6 dimensions: overall assessment of strength/fitness, salience (relative importance of weight and shape to the individual), attractiveness (positive sense of attractiveness in relation to the opposite sex), lower body fatness (extent of fatness perceived to occur around the hips), feeling fat, and disparagement (feelings of self-loathing in relation to the body). Subjects were also asked to indicate how frequently they participated in 14 physical activities during their leisure time. Linear regression and correlation procedures were used to analyse the data obtained.

The results suggest that there is a complex relationship between sports participation and body attitudes for female adolescents. The relationship between body attitude and participation varied significantly depending on the sport played. Overall perception of strength/fitness was significantly negatively related to the majority of the 14 activities analysed. Participants in running and athletics tended to rate themselves less positively than non-participants in most of the BAQ measures. However the overall conclusion drawn is that physical activity participation and body dissatisfaction are not related. It is acknowledged that causality in the relationship between physical activity and body attitudes cannot be concluded from this correlational study. The results obtained may merely indicate that participation in certain physical activities is motivated by poor body image.

vii. Delaney W. and Lee, C. (1995) "Self-Esteem and Sex-Roles Among Male and Female High School Students - Their Relationship to Physical Activity", Australian Psychologist, Vol. 30, No. 2, pp. 84-87.

Impact: self-esteem
Population: adolescents
Methodology: multivariate quantitative
Country: Australia

Authors' abstract

It has been suggested that participation in sport and exercise can increase self-esteem. However, it is also argued that sport is primarily a masculine activity, and females who are involved in sport may experience some role conflict. This cross-sectional study examined Australian adolescents of both sexes, and compared those who reported exercising at least three times per week with those who did not. The male and female high-active respondents, by comparison with the low-active sample, were characterised by higher self-esteem and by higher scores on the positive-feminine scale of the Australian Sex Role Inventory. It may be possible that increased self-esteem, arising from successful participation in exercise or sport, enables young people to develop a sense of self which is less limited by social expectations or what is appropriate for one sex or the other.

Additional comments

The sample included in this study was 163 science students (72 male, 91 female) in Year 10 or 11 at an Australian high school (exact location not specified). The students were aged between 14 and 17 years old (mean = 15.6 years). Questionnaires were completed anonymously by students during class. Participation was voluntary, with a final response rate of 81%.

The questionnaire collected data in relation to age, sex, and involvement in competitive and non-competitive sport and physical activity. Students who reported three or more sessions per week of physical activity were classified into the 'high active' group (representing approximately 50 per cent of the sample) while all others were classified into the 'low active' group. Participants also completed the Australian Sex Role Inventory (ASRI), in which respondents rate themselves in terms of positive and negative masculine and feminine characteristics and several social desirability items, and the Schools Short Form of the Coopersmith Self Esteem Inventory. A two-way multivariate analysis of variance was used to analyse the data.

The results of this study show significant differences between the high-active and low-active groups in relation to self-esteem and the positive measures of the ASRI. The authors subsequently conclude that adolescents who exercise regularly tend to have higher self-esteem than those who do not and are more likely to describe themselves positively. However, it must be noted that no causal link can be established by this cross-sectional study. While these results support the notion that regular physical activity may increase self-esteem, it is also possible that these results merely show that those with high self-esteem are more likely to be physically active. In addition, the fact that the sample was drawn exclusively from the one discipline (a science) at a single high school may partially limit the generalisability of the results.

viii. Grove, J.R., Webb, S., Gorley, T., Randall, N., Smith, K. & Harrison, J. (1996) "The Influence of Exercise & Lifestyle Education on Physical & Psychological Aspects of Health in Older Men", The ACHPER Healthy Lifestyles Journal, Vol. 43, No. 3, pp. 23-27.

Impact: personal well-being, mood
Population: older males
Methodology: multivariate quantitative
Country: Australia

Authors' abstract

Men from two age groups (45-59, 60-79) were assessed on a number of physical and psychological measures before and after exposure to various combinations of exercise and lifestyle education. The exercise intervention involved participation in either 0, 1, or 3 moderate-intensity exercise sessions each week for 30 weeks, while the lifestyle education intervention involved participation or non-participation in a series of health-related workshops over the same period. Results indicated that several of the measures differed across age groups, and that some of them were favourably affected by the interventions. Discussion focuses on the potential benefits of exercise and lifestyle education among middle-aged and older men, as well as the way in which these types of programs could be structured to meet the unique needs of this population.

Additional comments

Participants in this study were 83 retired males who responded to advertisements placed in community newspapers or from direct contact with Rotary and Probus clubs. Forty-three men were in the 45-59 year age group (mean = 50 years) and 40 men were aged 60-79 years (mean = 68 years).

Participants were randomly assigned to one of four groups: control, health education only, health education plus one exercise session per week, or health education plus 3 exercise sessions per week. The health education groups attended a series of 10 workshops on health and lifestyle issues held once every 3 weeks. Those in the exercise groups participated in either one or three supervised exercise sessions per week for a period of 28 weeks. Each session lasted for one hour and included a number of different aerobic activities (e.g. walking, low impact aerobics, aerobic dance and volley ball). Participants monitored their own heart rate and were encouraged to adjust their activity levels to maintain their heart rate at approximately 60% of their estimated maximum. Subjects in the control group did not participate in either the health education or exercise sessions.

Both physical and psychological measures were assessed at three stages during the 30 week testing period: pre-program assessment (week 1), mid-program assessment (weeks 14-16) and post-program assessment (weeks 28-30). The psychological measures were mood states, exercise locus of control, health locus of control and self-reported psychological symptoms. The data was analysed using a 2 (age group) x 2 (time of testing) x 4 (activity group) Analysis of Covariance, controlling for initial levels.

Results suggest that health education and exercise interventions may have a positive counteracting influence on the age related declines in certain physiological variables. However the overall impact of the program on psychological factors was less apparent. Significant differences between groups were not observed in terms of improvements in mood

or health locus of control. Improvements in exercise locus of control measures were found to be strongly influenced by age. Participants in the 45-59 year age group reported significant improvements in feelings of personal control with increasing treatment exposure while the opposite findings were observed for the 60-79 year age group. In terms of self-reported psychological symptoms, the treatment program was shown to have a significant impact only for those in the 60-79 year age group; however, this was limited to the mid-program assessment only. It is also unclear whether subjects were given any instructions relating to exercise undertaken outside of the supervised exercise sessions and how other exercise participation may have influenced these results.

ix. Grove, J.R., Wilkinson, A. & Dawson, B.T. (1993) "Effects of Exercise on Selected Correlates of Smoking Withdrawal", International Journal of Sport Psychology, Vol. 24, pp. 217-236.

Impact: social behaviour
Population: women
Methodology: multivariate quantitative
Country: Australia

Authors' abstract

Female smokers (N = 13) provided baseline data on cigarette cravings, mood states, sleep patterns, resting heart rate, and body weight and then either stopped or substantially reduced their consumption of cigarettes. Half of the participants took part in 15 minutes of daily exercise at 75% of estimated maximum heart rate during the first week of withdrawal, while the other half served as a control group. Results indicated that the exercise intervention had both positive and negative effects on the variables of interest. Cigarette cravings were lower for the exercise group than the control group during initial withdrawal, and there was some evidence that POMS Confusion scores were lower for the exercise group. Sleep disturbances and resting heart rates, on the other hand, were higher for the exercise group than for the control group. These findings are discussed in relation to the use of exercise in smoking cessation programs.

Additional comments

The participants in this study were 13 female students (mean age = 23 years) from the same university who had responded to advertisements from around the university campus.

Preliminary information was collected from each participant in relation to demographic variables (age), number of years spent smoking, percentage of family and friends who smoke, number of previous attempts to stop smoking, initial fitness, smoking dependency (the Fagerstrom Tolerance Questionnaire) and ability to cease smoking (the Cessation Self-Efficacy Questionnaire). This was used to match subjects before they were randomly assigned to either the treatment group (n = 6) or control group (n = 7). Analysis of Variance indicated that this process produced two groups with no significant differences in terms of the variables selected. During the testing phase, subjects in both groups were asked to "cease or substantially reduce" their daily consumption of cigarettes and members of the treatment group began a 7-day program involving 4 sessions of supervised exercise undertaken on alternate days. This consisted of 15 minutes of exercise on a bicycle ergometer at 75% of estimated maximum heart rate. Control subjects remained in the laboratory for an equal amount of time but did not undertake the supervised exercise.

Subjects in both groups were asked questions relating to the dependent variables of mood states (measured by the Profile of Mood States questionnaire), cigarette cravings (measured by the craving subscale of the Shiffman-Jarvik Withdrawal questionnaire), sleep disturbances (measured by a 3-item inventory developed by the authors), resting heart rate and weight. A 2 (groups) X 7 (observation times during treatment and follow up) Analysis of Variance was conducted for each of these dependent variables to assess the effects of the exercise treatment over time.

It was found that the exercise group reported better results than the control group in relation to some of the variables tested but worse on others. It was therefore concluded that regular

exercise may not have a general positive effect on physiological and psychological processes during tobacco withdrawal.

However, the reliability of this finding is strongly influenced by a number of methodological concerns relating to the study. The small sample size would have strongly impacted on the conclusions made - one person having a 'bad day' could have had a major effect on the results. It is also important to note that the treatment phase of this study was only 7 days in duration and that only 4 sessions of 15 minutes of supervised exercise were included. The short duration of this treatment regime and its laboratory setting limit the conclusions that can be drawn. In addition, it is unclear how much information the subjects were given when they were provided with an overview of the study and whether their expectations of the study may have influenced the results obtained. For example, it is suggested that cigarette cravings may be influenced by expectancies for positive or negative outcomes. This, rather than the treatment regime itself, may explain the lower cigarette cravings reported for the exercise group during initial withdrawal. While the results of this study indicate that regular exercise may be of assistance in relation to some of the physiological and psychological factors associated with tobacco withdrawal, the sample size is such that the conclusions drawn cannot necessarily be applied to the general population.

x. Hodge, K. (1989) "Character Building in Sport: Fact or Fiction?", New Zealand Journal of Sports Medicine, 17, pp. 23-25.

Impact: social behaviour, development of life skills
Population: general population, participants
Methodology: literature review
Country: New Zealand

Author's abstract

Sport advocates often suggest that sports participation cultivates moral development, sportsmanship, fair play, self-reliance and courage, to name but a few 'desirable' character traits commonly associated with the sport experience. However, empirical evidence to support these claims is fragmented and less than convincing; indeed much of the literature supporting the character-in-sport phenomenon is only anecdotal nature. In this paper, the social psychological construct of character is defined with particular emphasis placed on the central element of character - that is, moral reasoning. The literature on moral reasoning in sport is then selectively reviewed and conclusions are drawn regarding the efficacy of the claim that "sport builds character". The relative merits of organised sport and informal games are also discussed with respect to moral and character development, and the potential positive and negative developmental outcomes of participation in organised sport are outlined. Finally, some brief recommendations are offered regarding future research directions and the practical steps required to increase the developmental benefits of sport participation.

Additional comments

This report defines the construct of character with particular emphasis on moral reasoning, which is historically viewed as the central element of character. The report then reviews numerous studies that have investigated the topic of moral development in sport and physical education. The central theme of previous research emphasises that while participation in sport has the potential to positively influence an individual's psychosocial growth, it is the nature of the experience that the individual is exposed to within sport or physical activity settings that determines the moral worth and its usefulness as a character building endeavour.

The author notes that previous studies have found that sports-people tend to adopt lower levels of moral reasoning in sport situations than in everyday life situations, suggesting that they do not view the sport situation as real-life and adjust their moral reasoning accordingly. This is likely to be greatly influenced by the prevailing norms, values, attitudes and beliefs present in the sporting environment. In some cases it has also been found that participants of competitive sport display lower ethical values than non-participants. This suggests that participation in sport does not necessarily contribute to positive moral development and subsequent character growth and, in some cases, can actually encourage selfishness, envy, conceit, hostility and bad temper. The report also discusses differences between formal and informal participation and suggests that in order for sport to contribute to a participant's development there is need for a restructure of the sporting situation to allow for greater play-participant control and less authoritarian control by leaders.

The author notes the lack of empirical research available on this subject, particularly in the Australian and New Zealand context and recommends that further, longitudinal investigations should be conducted to more thoroughly assess the developmental effects of sports participation.

xi. Jensen, B., Sullivan, C., Wilson, N., Berkley, M. and Russell, D. (1993) The Business of Sport and Leisure, Hillary Commission, Wellington.

Impact:	personal well-being, mood, self-esteem, crime prevention, social cohesion, community pride/identity
Population:	general population, youth-at-risk, aged, persons with disabilities, unemployed
Methodology:	literature review
Country:	New Zealand, USA, Canada

Authors' abstract not provided

Additional comments

This report reviews the economic and social impacts of sport and leisure in New Zealand. A broad range of social impacts are discussed including the impact of physical leisure on mental health, social integration and disadvantaged groups, and the use of sport and leisure within the justice system.

The report notes that there is a relatively large body of research investigating the relationship between exercise and improved mental health, and that the bulk of this has found some degree of association between these factors. It is claimed that physical activity is positively associated with better mental health, including positive mood, lower levels of anxiety and improved self-esteem. Previous research has also found associations between participation in exercise and improvements in levels of depression (though not severe depression) with some results indicating that exercise can offer benefits equivalent to other more traditional forms of treatment including psychotherapy. However, the authors note that many of the studies which focus on the relationship between participation and mental health suffer from methodological limitations (e.g. non-random sample selection, lack of control conditions) and that a clear case of causality has not been established. It is acknowledged that the precise nature of the relationship between exercise and mental health has not been established and that factors associated with exercise experience, such as the provision of a distraction to everyday problems, may be at least as important as the exercise itself. In addition a number of articles found that exercise participation may be associated with negative mental effects, including increased tension, particularly when the participation is of a more competitive nature.

The authors provide only a brief perspective on the topic of social integration. It is broadly claimed that sport contributes to social integration of groups; however, the authors provide some evidence that, especially at the elite level, sport often reinforces class differences and social mobility is rarely observed. Although, sport has the potential to contribute to an individual's growth and moral reasoning, these positive effects do not occur in all cases. Indeed some researchers argue that sport can actually encourage anti-social behaviour.

The authors identify three ways that physical leisure can potentially help in reducing crime (sport as part of a prison rehabilitation program; sports participation preventing youth from taking part in crime; Wilderness programs to reduce recidivism). This report provides numerous examples of anecdotal evidence supporting the value of physical recreation in prisons, particularly in the reducing tension and frustration.

Although several studies show that sports participation is associated with slightly lower levels of delinquency in youth, there is no sound empirical evidence to support causation. Further,

not all studies found sports participation reduced delinquent behaviour, with some studies finding associations with more delinquency. Both research and anecdotal evidence support the conclusions that wilderness programs for youth at risk are effective and can produce improvements in an individual's self-concept. Recidivism rates, at least in the short term, have been shown to decrease after participation in these programs. However, the authors also note that these programs may not be effective in preventing crime over the longer term and emphasise the need for such programs to be combined with broader social initiatives.

This review also looked at the social benefits of sport for people with disabilities, older persons and the unemployed and how sports offers such groups the opportunity to participate more fully in the community and can broadly enhance their quality of life. However, much of the evidence provided is anecdotal; there is limited formal research on these topics. The report also briefly discusses the positive links between elite sport and national pride/identity.

xii. Kiewa, J. (1996) "Body Satisfaction and Competence: Hand and Glove?" Social Alternatives, Vol. 15, No. 2, pp. 7-10.

Impact:	self-esteem
Population:	women
Methodology:	qualitative
Country:	Australia

Author's abstract not provided

Additional comments

This article discusses the nature of the body and its cultural determination. It then discusses the results of a survey of body satisfaction for women involved in outdoor activities.

The survey included 205 women involved in a number of different outdoor pursuits including rockclimbing, kayaking, bushwalking, sailing and cycling . The age of participants ranged from women in their twenties to women in their sixties. As this article merely discusses the results obtained, details of the survey items are unclear. However, it appears that the women were asked a number of open-ended questions relating to their body image, for example, they were asked to comment on what aspects of their bodies caused them any dissatisfaction or satisfaction, to rate how satisfied they were with their bodies and to indicate how their participation in outdoor activities has contributed to their overall satisfaction. Responses were summarised into a number of common themes.

The results indicate that these women were generally happy and that, for some, feelings of body satisfaction were closely related to participation in outdoor activities. Participants reported that participation in physical activity improved body image by improving strength, fitness and muscle tone, providing a sense of achievement and improving overall feelings of physical competence. It is acknowledged that a small number of participants indicated that participation in outdoor activities had a negative effect on their body image. Empirical research utilising tailor-made activity programs and including a non-athlete control group is warranted to further investigate the links between physical activity participation and body image.

xiii. Mason, G. and Wilson, P. (1988) Sport, Recreation and Juvenile Crime: An Assessment of the Impact of Sport and Recreation upon Aboriginal and Non-Aboriginal Youth Offenders, Australian Institute of Criminology, Canberra.

Impact:	crime prevention
Population:	indigenous, adolescents
Methodology:	literature review
Country:	Australia, USA, Other (France)

Authors' abstract not provided

Additional comments

This report examines the impact of sport and recreation upon offending behaviour among young people, in particular Aboriginal delinquent youth. The authors review a comprehensive range of articles, mainly from the mid 1980s, in order to provide a theoretical perspective on the association between sport and delinquency. Previous research investigating links between sports participation and delinquency are considered and a range of existing programs, both in Australia and overseas are discussed. By assessing successful sport or recreation programs the authors identify the elements that appear to play a positive role in preventing delinquency.

There is strong theoretical support in favour of a relationship between sport participation and a reduced level of delinquency, with various theories proposed to explain the relationship. Previous research, particularly in the United States, provides some support for the theory that sport can be effective in improving participants' self-esteem and reducing recidivism rates over the short term. However, in the case of some programs, positive results such as these have not been observed and overall there is a general lack of suitable evaluation of existing sporting programs for at risk youth, particularly over the longer term. There is also evidence that some sports, especially aggressive or elite sports, may be associated with increased levels of offending and that programs which may be successful for some groups may be less effective for others (particularly in the case of indigenous/non-indigenous populations). The authors note there has been limited research devoted to the role of sport and recreation in preventing delinquency in girls. In addition, due to a lack of conclusive evidence a causal relationship between sport and delinquency has yet to be established.

Much of the research on this topic has been undertaken overseas and a large proportion focusses on wilderness programs. The majority of these programs report short-term success; however, the standard of evaluation is poor. Very little research has been performed on this topic in Australia. A small number of Australian wilderness or outdoor programs have revealed mixed results, some reporting positive outcomes whilst others revealed little or no change. Very few programs have been formally evaluated, though anecdotal reports indicate the programs have much to offer delinquent youth by boosting self-esteem and confidence. The authors provide a thorough discussion on the key elements that need to be considered in planning wilderness camps and note that these are equally applicable to camps designed for non-institutionalised youth.

There is a belief in Aboriginal communities that sport or recreation activities may provide positive alternatives to the problem behaviours that exist among their people. The authors stress that for such programs to be successful the indigenous community needs to be closely involved in their development.

The authors recommend that sport and recreation programs should be viewed as only one feature of a general strategy to improve the opportunities of young people. It is unrealistic to expect that these programs will work successfully in isolation when other issues, such as unemployment and poverty, also need to be addressed. Recommendations are made regarding the establishment of wilderness camps as an alternative to incarceration; the development of sport or recreation programs as a preventative role for youth-at-risk; and the development of sporting and recreation facilities and opportunities for Aboriginal communities including financial assistance.

xiv. McInman, A.D. & Berger, B.G. (1993) "Self-Concept and Mood Changes Associated with Aerobic Dance", Australian Journal of Psychology, Vol. 45, No. 3, pp. 134-140.

Impact: mood, self-esteem
Population: women
Methodology: multivariate quantitative
Country: Australia

Authors' abstract

This study examined relationships between short-term changes in self-concept and mood associated with aerobic dance participation. Female aerobic dance participants ($n = 75$) and female university students ($n = 42$) completed multidimensional measures of mood (Profile of Mood States; Shacham, 1983) and self-concept (Self-Description Questionnaire III; Marsh, 1992) before and after their respective activities. Analyses revealed significant positive changes for aerobic dance participants on specific dimensions of mood, whereas controls showed minimal changes. Similar analyses for self-concept revealed significant, but weak changes on 10 to 13 scales by aerobic participants. Controls showed one positive and one negative change. Neither extent of mood change, nor Social Physique Anxiety, mediated changes in self-concept. Generally, correlations between self-concept and mood scales were not high, although emotional stability self-concept, physical appearance self-concept, and global self-concept correlated moderately with specific dimensions of mood.

Additional comments

The sample in this study consisted of 75 female aerobic dance participants at a Perth university recreational exercise centre and a control group of 42 female physical education students from the same university and a nearby college of advanced education. The aerobic dance participants ranged in age from 15-43 years (mean = 23.09). Those in the control group ranged from 17-28 years of age (mean = 20.39).

The aerobic dance group participated in a 60 minute aerobic dance class while the control group attended a 60 minute lecture. All subjects were administered two questionnaires before and after the class. Schacham's abbreviated version of the Profile of Mood States Questionnaire measured six subscales of mood: Anger, Confusion, Depression, Fatigue, Tension and Vigour. The Self Description Questionnaire III which consists of 13 dimensions of self-concept: Academic, Emotional Stability, English, General, Honesty, Maths, Opposite Sex Relations, Parental Relations, Physical Ability, Physical Appearance, Problem Solving, Religion and Same Sex Relations was also administered. In addition, participants in the aerobics class were asked to complete the Social Physique Anxiety Scale following the activity. This measured the degree of anxiety each participant experienced in response to others' evaluations of their physique. This measure was included in order to test the hypothesis that those with a more negative body image would obtain less psychological benefit from the class. The data obtained was analysed with using a 2 (group) X 2 (pre-, post-activity) Multivariate Analysis of Variance procedure.

The results indicate that short term changes in mood were greater for those who participated in a single session of aerobic dance than for the control group. Significant improvements from pre- to post- measures for the aerobic dance participants were observed for five of the six POMS subscales: Anger, Confusion, Depression, Tension and Vigour. Similarly, positive changes in self-concept were significantly more pronounced for the aerobic dance participants

than for members of the control group. Aerobic dance participants reported significant increases on 10 of the 13 subscales (Academic, Emotional Stability, General, Honesty, Maths, Opposite Sex Relations, Parental Relations, Physical Ability, Physical Appearance and Problem solving) after participating in the 60 minute class. Further analysis of the aerobic dance group incorporating the results of the Social Physique Anxiety Scale showed that, contrary to initial expectations, exercise induced improvements to self concept were unrelated to physique anxiety. It should be noted that this study made use of pre-existing groups rather than random allocation of subjects, which may have impacted on the observed results. Also, members of the aerobic dance class had significantly different levels of prior experience - this study does not investigate experience related differences in class outcomes.

xv. McIntyre, N., Coleman, D., Boag, A. and Cuskelly, G. (1992) "Understanding Masters Sports Participation: Involvement, Motives, and Benefits", The ACHPER National Journal, No. 138, pp. 4-8.

Impact:	personal well-being, mood
Population:	mature athletes
Methodology:	program evaluation, qualitative
Country:	Australia

Authors' abstract

This paper reports on a study of the 1991 Masters Games in Brisbane. A random sample of 600 participants was surveyed through a self-administered mail-back questionnaire. Masters Games participants were questioned about their reasons for participation and their level of involvement in masters sport.

This paper also discusses the types of personal benefits that arise from sport and physical activity and makes use of the insights on motivations and involvement provided by this study to examine the likely beneficial outcomes from masters sports participation.

Additional comments

A random sample of 600 participants was selected from 5130 registrants in the 1991 Masters Games held in Brisbane. A letter inviting participants to complete a questionnaire was sent out one week after the conclusion of the games. A total of 504 persons (84% of the original sample) responded. These respondents were 71% male and two thirds were between the ages of 40 and 54 years (mean age = 49).

A number of questions relating to involvement in masters sport, motivations for participation and benefits of participation in masters sport were included in the questionnaire. The Enduring Involvement Scale asked respondents to rate feelings such as enjoyment, self-expression and importance of masters sports. The majority of results presented relate to motivation for participating in the Masters Games rather than the benefits obtained from participation. However, it is suggested that enjoyment, physical well-being and stress reduction were perceived to be significant benefits of participation in masters sports. It should be noted that this article focuses specifically on participation in the Masters Games rather than on a more general investigation of the benefits of physical activity participation. As a result the outcomes of this study are likely to be to a large extent "event specific". This may limit the applicability of the findings to the broader population and to sports participation in general.

xvi. Patterson, I. and Chang, M. (1999) "Participation in Physical Activities by Older Australians: A Review of the Social Psychological Benefits and Constraints", Australasian Journal on Ageing, Vol. 18, No. 4, pp. 179-185.

Impact: mood, personal well-being, social cohesion
Population: aged
Methodology: literature review
Country: Australia, USA

Authors' abstract

Participation in physical activities has been found to be an important factor in contributing to a healthy lifestyle. Research has found strong relationships between participation in regular physical activity and the prevention of disease, while its relationship to the psychological and social dimensions have been neglected. Recently however, several studies have found causal relationships between physical activity and improved mood state, reduced anxiety, reduced depression, and increased social support. Despite this, surveys indicate that participation levels in physical activities are declining among older Australians, with the exceptions of walking and gardening. This paper also examines the constraints to participation in leisure programs, such as lack of time, poor health, fear of crime, the financial cost and the lack of a partner to participate with. A number of strategies have been suggested to overcome these constraints.

Additional comments

This report reviews both Australian and international studies that focus on the psychological and social benefits of physical activity for older adults.

The report notes that numerous recent studies have examined links between physical activity and psychological functioning. The most commonly identified psychological benefit of aerobic exercise is that it improves their mood state. Other benefits include improved sleep patterns, reduced stress, reduced anxiety, and improved self-confidence. Evidence is also presented in support of the theory that exercise does not have to be vigorous to obtain positive mental health outcomes.

The causal relationship between social support and exercise is also examined. The literature reviewed supports the notion that physical activity serves an important role for older persons in terms of regular social interaction and friendships and indicates that these benefits are in turn significantly related to adherence to exercise programs. The report also considers the question of why there is a decline in physical activity for older persons.

The authors note that some recent studies which investigate links between physical activity and psychological factors have associated methodological weaknesses, due to small sample sizes, failure to use random assignment and control groups, and in some cases, non-standardised instruments. In such cases, these issues limit the conclusion that can be drawn from the reported findings.

xvii. Rowe, D. and McGuirk, P. (1999) "Drunk for Three Weeks: Sporting Success and City Image", International Review for the Sociology of Sport, Vol. 34, No. 2, June, pp. 125-141.

Impact: community pride/identity
Population: general population
Methodology: case study
Country: Australia

Authors' abstract

This article analyses the role of sport in the projection of city image (especially in non-metropolitan areas) and its significance as an urban and regional marker of civic progress and triumph over adversity. It presents a case study of the extraordinary community and media response to the 1997 grand final victory of the Newcastle Knights in the Australian Rugby League's inaugural Optus Cup competition. In discussing the case study material and current debates on commerce, culture and place-marketing, the article canvasses the importance of sport in generating significant economic activity and urban redevelopment; reflecting and projecting, especially in de-industrialising cities, the growth of the service sector of the economy; promoting the image or "brand identity" of the city by identifying the success and interests of the team with that of the city; and functioning as a locus of community affect and identity which reproduces the concept of spatially constructed unity. The article cautions against an undue reliance on sports teams as indices of civic health, and on the use of sport to obscure cultural differences, structural social inequalities, and the deep impact of de-industrialisation.

Additional comments

This paper discusses the role that sports clubs, teams and events play in the projection of city image and community pride. The 1997 Grand Final victory of the Newcastle Knights in the Australian Rugby League Optus Cup competition is discussed in detail.

The article describes how sporting teams are commonly seen as representatives of their community of origin, often to the extent that the team is said to embody the, often mythological, characteristics of that community. As such, the success of sporting teams may be seen as the triumph of the community as a whole and of the values and beliefs which that community represents. The authors describe how, against such a background, sporting success may result in significant improvements in community pride. Sporting success, and the ability to attract major sporting events may also be a factor in the economic resurgence of such areas as, particularly the service industry, seek to exploit the resultant growth in optimism.

It should be noted that the specific focus of this article is on the city of Newcastle and the impacts discussed are described largely in this context. The authors note that while, in this case, the benefits of sporting success for communities such as Newcastle are clear, the ability of sport to positively impact on underlying community problems, particularly over the longer term, may be limited and should not be over-stated. The point is also made that communities that benefit from sporting success may in turn suffer negative impacts from lack of success or loss of events.

xviii. Savage, M.P. and Holcomb, D.R. (1997) "Physical Activity Levels and Self-Reported Risk-Taking Behaviour Among Rural Australian and American 7th-9th Grade Adolescents", International Quarterly of Community Health Education, 1997-1998, Vol. 17, No. 4, pp. 345-360.

Impact: self-esteem, personal well-being, social behaviour
Population: adolescents
Methodology: multivariate quantitative
Country: Australia, USA

Authors' abstract

This study compares self-reported physical activities and selected health behaviours (i.e., participation in physical activity, alcohol and cigarette use, perceived level of energy, and satisfaction with body weight) of a sample of seventh and ninth grade adolescents from Australia and the United States. A modified version of the Personal Wellness Profile 400™ (PWP 400) was used to measure adolescents' participation in physical activity and health behaviours. Five of the seven items studied showed significant differences ($p < .05$). Ninety-seven percent of Australian adolescents reported they engaged in physical activity long enough to work up a sweat four or more times per week, compared to 94 percent of U.S. adolescents. The Australian cohort, however, reported a significantly higher level of ever smoking (34.1% vs. 12.3%), and drinking alcohol during the past year than did the U.S. adolescents (55.0% vs. 16.0%). Male adolescents demonstrated significant differences on five of the seven items measured. Australian males reported greater participation in physical activity, smoking and drinking, and reported they had higher levels of energy than did the U.S. males. The female adolescents also demonstrated significant differences on five of the seven items measured, e.g., over 76 percent of Australian females reported engaging in strength exercises at least once a week compared to 59 percent of U.S. females, and only 23 percent of Australian females reported sedentary compared to 41 percent of U.S. females. Finally, the relationship between physical activity and involvement with risk-taking behaviours and health-related attitudes for both samples was examined. Increased activity was associated with less smoking, more satisfaction with body weight, and perceived higher energy level for U.S. adolescents. Drinking alcohol was not associated with activity level for U.S. adolescents. For Australian adolescents there was no association between physical activity and risk-taking behaviours and health-related attitudes. Future research should continue to examine cultural differences.

Additional comments

This study included a sample of 1040 school students (7th - 9th graders) in Australia and the United States. The Australian sample consisted of 220 students from a rural community in an eastern Australian State, while the US sample was made up of 820 students from three rural communities in Indiana. These schools were selected based on their geographic and socioeconomic similarities. The Australian sample was 65% male (mean age of 13.2 years) while the US sample was 71% female (mean age of 13.9 years).

All participants completed the Personal Wellness Profile 400 questionnaire which measured self-reported physical activities, perceived energy levels, perceptions of body weight and smoking/alcohol use. Frequency of participation and level of engagement in regular physical activity were assessed and used to classify students as sedentary (0-2 exercise times per week), active (3 exercise times per week) or very active (4 or more exercise times per week).

The questionnaire was slightly modified for the Australian sample to reflect differences in the types of sports commonly played. In each of the three US schools, physical education teachers distributed the questionnaires during the last semester of 1994. The same questionnaire was administered to the Australian students by one of the authors during a regular class time in 1995. Chi-square analysis was used to examine the data obtained.

Initial analyses examined the differences between the Australian and US samples in terms of the frequency of participation of physical activity, preferred physical activities and differences in selected health behaviours and attitudes. The results for the relationship between physical activity, risk-taking behaviours and health-related attitudes indicate that for the U.S. adolescents, increased activity was associated with less smoking, more satisfaction with body weight, and higher perceived energy levels while alcohol use was unrelated to physical activity. However, for the Australian adolescents, there was no association between physical activity and risk-taking behaviours and health related attitudes. It should be noted that causality can not be concluded from this research. The authors also acknowledge that the proportion of males and females and the use of culturally and geographically diverse samples should be considered when interpreting these results.

xix. Seedsman, T.A. (1994) "The Physiological, Psychological and Social Effects of Exercise and Recreation for Older Adults", Lincoln Papers in Gerontology, No. 23, January, pp. 1-66.

Impact: personal well-being, , mood, self-esteem
Population: aged
Methodology: literature review
Country: Australia, USA

Author's abstract

This paper examines a range of lifestyle factors thought to contribute to the health and well-being of older adults. In particular, the contribution of multidisciplinary research is shown to offer encouraging evidence to support the value of regular participation by older adults in appropriate physical and recreational activities. The term 'physical gerontology' is introduced to describe physical activity programming for older adults that incorporates sport and exercise. It is argued that self-responsible behaviour and self-monitoring practices are important factors in the development and maintenance of personal health during old age. The point is made that society must also be active in promoting health conscious and health promoting lifestyles for older adults. The benefits of regular physical activity are discussed, including programming considerations and cautions for older adults known to be 'at risk'. It is demonstrated that social and economic barriers may result in the non-adherence by older adults in the adoption of an 'active lifestyle'. The admonition to 'act your age' is also shown to represent a subtle but powerful form of ageism. Recreation is held to offer a range of social and psychological benefits, thereby enhancing the potential for life satisfaction and quality of life. It is concluded that a balanced mix of physical activity and stimulating recreation appears to be an important component of a preventive health model aimed at promoting vital and meaningful lifestyles for older adults.

Additional comments

This paper reviews numerous articles, mainly from the late 1980s and the early 1990s, in an effort to examine the impact of exercise, physical activity and recreation on the health and well-being of older adults aged over 55 years. Much of the discussion focusses on the physical components of health, namely hypertension, osteoporosis, muscular strength and general endurance. However, several sections examine research findings on the psychological outcomes of exercise.

Several researchers have found exercise to be an effective therapy for treating depression in older adults, however other studies investigating this relationship have been less conclusive. Previous research has also found links between exercise and reduced levels of anxiety, particularly in the case of non-competitive, aerobic exercise. However, in most cases benefits were observed over the short term and a regular program may be necessary to ensure long term benefits.

The research examined in this paper concludes that older people who are physically active tend to be happier as well as scoring higher on self-esteem and quality of life measures than those who are sedentary. Exercise is also held to increase life satisfaction in the elderly by enhancing the participants generalised feelings of self-concept, self-efficacy and competence.

It should be noted that precise details of the connection between life satisfaction, psychological health and physical activity have not been clearly resolved. While inactivity is

known to be associated with negative affect and depressive symptoms, the direction of the relationship is still uncertain. Anecdotal evidence suggests that a lifestyle that includes regular physical activity may be associated with higher levels of health, general well-being and self-esteem. However, the positive results observed in some studies may be influenced by the non-physical aspects of the activity, such as the increased opportunity to socialise.

xx. Sikking, M.J., Gidlow, B., Perkins, H.C. (1993) "Therapeutic Outdoor Recreation Programmes for Youth-At Risk: A New Zealand Case Study", ANZALS Leisure Research Series, 1, pp. 166-183.

Impact: social behaviour, development of life skills
Population: youth at risk
Methodology: program evaluation, qualitative
Country: New Zealand

Authors' abstract not provided

Additional comments

This paper presents a qualitative evaluation of three therapeutic outdoor recreation programmes for youth-at-risk in New Zealand held between 1988 and 1990. It discusses the influence these programs have on participants' behaviour and assesses the validity of the assumptions underlying many therapeutic outdoor recreation programmes that self-esteem and associated behaviour can be modified through positive, challenging, experiences.

The first, the Wilderness Experience ACCESS Course, consisted of a fifteen-day outdoor expedition and a six-week employment readiness program. Participants were required to attend an interview as part of the selection process. They were generally aged between fifteen and twenty-five, with approximately forty percent being female. Sixty percent of participants were Maori. The National Support Wilderness experience consisted of two four-day expeditions immediately following one another. Selection was made after interviews with the participants, their parents and any support persons. The Recreation for Youth Trust offered a series of day-long outdoor recreation activities for young people who were part of a detoxification program and a six-day kayaking expedition for five adolescent males who were residents of a youth home.

The authors suggest that the task of a therapeutic program is to disconnect participants from their previous reference group or youth-at-risk sub-culture and to encourage the formation of 'expedition sub-cultures'. These sub-cultures establish their own set of rules, specific expectations of behaviours and are responsible for administering their own justice. The authors observed that three strategies were important to the success of these programs: selection of willing and cooperative participants; removal of participants from usual environment for a reasonable period of time; and provision of a sense of responsibility for the day-to-day management of the expedition, possibly by means of a contract and/or a day-leader system. A key factor in the success of these programs was the incorporation of a non-threatening discussion forum that allows participants to express their feelings, needs and experiences.

The authors note that it may be difficult for participants to avoid returning to their at-risk sub-culture following the completion of the program and refer to a number of previous studies which indicate that the long term effect of such programs may be limited. Consequently it is recommend that youth-at-risk receive continuing support from family, friends and counsellors to ensure that the benefits received from programs such as those discussed are maintained.

xxi. Stanton, J.M. & Arroll, B. (1996) "The Effect of Moderate Exercise on Mood in Mildly Hypertensive Volunteers: A Randomized Controlled Trial", Journal of Psychosomatic Research, vol. 40, No. 6, pp. 637-642.

Impact: mood
Population: persons with existing mild hypertension
Methodology: multivariate quantitative
Country: New Zealand

Authors' Abstract

This study reports an investigation of the effect of participating in moderate exercise (three 40-minute sessions of brisk walking a week for 6 months) on mood state in 177 sedentary, mildly hypertensive volunteers. Mood was assessed by the Profile of Mood States, Bipolar Form (POMS-BI), and no significant differences were found between control and exercise groups. The intervention group increased its exercise output more than the control group, but there was also a significant increase in exercise done by the control group. We conclude that exercise has no major effect on mood in hypertensive volunteers.

Additional comments

This study was part of an investigation into the effects of salt intake and exercise on blood pressure. Subjects were recruited through general practitioners and advertisements in community newspapers based on a number of specific criteria including existing (mild) hypertension and a sedentary lifestyle (less than 2 hours of moderate exercise per week). Although 181 participants (86 women, 95 men) ranging in age from 26 to 71 years (mean = 55 years) participated in the this study, complete data were only available for 177 subjects.

Subjects were randomly assigned to either the exercise (n = 90) or control group (n = 87). Those in the exercise group were instructed to participate in brisk walking for 40 minutes, 3 times a week for a period of 6 months. The bipolar form of the Profile of Mood States (including the subscales of composed-anxious, agreeable-hostile, elated-depressed, confident-unsure, energetic-tired and clearheaded-confused) and the Auckland Heart Study Exercise Questionnaire (AHSEQ) were administered. The AHSEQ measured levels of physical activity and asks participants to recall the amount of time spent participating in physical activities during the past 3 months. Baseline and 6 month follow up assessments using these measures were conducted for subjects in both groups. T-test analyses were conducted to examine the differences between control and exercise groups.

The results of this study indicate that exercise participation did not significantly impact on mood. No statistically significant differences between the exercise and control groups on any of the POMS subscales were obtained following completion of the program. However, it should be noted that results for the AHSEQ indicate that both the control and exercise groups significantly increased the amount of exercise participation over the 6-month treatment period which may have impacted on the results.

xxii. Sullivan, C. (1998) The Growing Business of Sport and Leisure: Social Impact of Physical Leisure - An Update, Hillary Commission, Wellington, New Zealand.

Impact:	social cohesion, self esteem, social behaviour, crime prevention, community pride/identity
Population:	general population, youth at risk
Methodology:	literature review
Country:	New Zealand, USA, Canada

Author's abstract not provided

Additional comments

This paper provides an update on an earlier report to the Hillary Commission (Jensen, Sullivan, Wilson, Berkley & Russell, 1993 - also included in this bibliography). The report focusses on recent literature, mainly from the early to mid 1990s, and discusses the impact of sport in three specific areas: social cohesion (at the individual, family and community level); youth-at-risk; and national pride/identity.

It is found that the beneficial outcomes of physical leisure on social cohesion at the individual level appear to be dependent on the situation (club culture, organisation structure) and influenced by the values and behaviours displayed by those involved (parents and coaches). There is general consensus that physical activity participation has a positive effect on self-esteem, although some evidence suggests that where the emphasis is on winning, self-esteem may in fact be damaged rather than enhanced.

While the author acknowledges the lack of research specifically focusing on the effect of sports participation on families, the outcomes of specific sporting programs and previous research focusing on leisure activities in general are said to support the notion that physical recreation can be effective in establishing social cohesion at the family level. It is claimed that families that spend leisure time together are more likely to be satisfied with relationships within the family. Sport and physical recreation is also claimed to have the potential to restore a sense of pride in the community by encouraging increased parental involvement in community activities. A number of authors have described how sports can help to break down class barriers; however, there is also evidence that suggests sport, especially elite sport, can act as a "...power agent for reproducing gender, ethnic and class inequalities".

While sport is often associated with reduction of problem behaviours in youth-at-risk, a number of studies conclude that sport plays no role in reducing problem behaviour and may even promote it. Positive results have been reported on the use of recreation programs targeting youth-at-risk in the USA, Canada and New Zealand, although it is noted that a solid body of evaluative evidence is not available as a result of methodological shortcomings associated with many studies. Although methodological weaknesses are common, studies of wilderness programs continue to confirm the potential to produce improvements in the social behaviour of youth-at-risk. Most studies suggest that for any long-term change to occur the programs need to offer follow-up programs including access to an alternative sub-culture on return to their usual environments. The author also notes that such programs should be considered as only a partial solution to the problems experienced by youth at risk.

The article also discusses the importance of sport as a vehicle for national identity and a source of national pride.

xxiii. Tatz, C. (1994) Aborigines: Sport, Violence and Survival, Criminology Research Council (Australia).

Impact: crime prevention, social behaviour, social cohesion, community pride/identity
Population: indigenous
Methodology: qualitative, case study
Country: Australia

Author's abstract

Project 18/89 "Aborigines: the Relationship between Sport and Delinquency" began as a small-scale study of forty-five communities over six months. The aim was to see whether or not sports facilities and competition reduced growing rates of adult and juvenile delinquency. In the end it became a five-year study of eighty communities involving in-depth interviews with 520 Aboriginal men and women, government officers of various specialisations, sports officials, police and correctional service officers.

The Criminology Research Council's initial grant resulted in numerous public lectures, radio and television broadcasts, photographic exhibitions, a journal article, feature newspaper articles and two books, the major one being *Obstacle Race: Aborigines in Sport*, published by the University of NSW Press in 1994.

This report concludes that:

- sport plays a more significant role in the lives of Aborigines than in any other sector of Australian society;
- sport provides a centrality, a sense of loyalty and cohesion that has replaced some of the 'lost' structures in communities that so recently operated as Christian missions and government settlements;
- sport has become a vital force in the very survival of several communities now in danger of social disintegration;
- sport has helped reduce the considerable internalised violence - homicide, suicide, attempted suicide, rape, self-mutilation, serious assault - prevalent in some disordered communities;
- sport is a cheap enough option in the way it assists in reducing the second-highest cause of Aboriginal deaths, namely, from external or non-natural causes;
- sport has been effective in keeping youth out of serious (and mischievous) trouble during football and basketball seasons;
- sport has given several communities and regions an opportunity for some autonomy and sovereignty when they organise sport and culture carnivals - such as at Yuendumu and Barunga in the Northern Territory;
- sport takes place despite the absence of facilities, equipment, money for travel, discrimination against teams and/or access to regular competition;
- sport takes place in circumstances and environs that resemble Afghanistan in wartime and Somalia in drought time;
- sport is *essential* to counter the morale and moral despair of many Aborigines.

This report recommends:

1. Sport in urban, peri-urban, rural and remote communities requires immediate financial boost in this twice-blessed land of Olympism - if for no other reason than that the year 2000 visitors should not see the present conditions.

2. A National Aboriginal Sports Commission - not solely dependent on government funding, and independent of other sport institutes - be established to provide grants, advice, staff and equipment *directly* to communities in need and not through regional agencies.
3. This Commission should establish special programs, through existing tertiary institutions and distance courses, to train Aboriginal and Islander sports administrators.
4. This Commission should work closely with the new initiatives in Aboriginal health, and oversee some expenditure on sport, leisure and recreation facilities as part of health rehabilitation, especially for diabetics.
5. This Commission should help alleviate the sport tax burden on Aborigines, people who pay more per capita for their sport than any other groups in Australian society.
6. While sport is not, and cannot be, the sole solution to the multitude of problems in Aboriginal and Islander society - because it cannot be played or practised 365 days in the year - it can be a 30 to 40 per cent solution for those communities now literally in peril.

Additional comments

This report discusses fieldwork conducted by the author between 1989 and 1993, during which time he visited 80 Aboriginal communities across mainland Australia and interviewed 520 Aboriginal men and women, government officers, sports officials, police and correctional service officers, in relation to their perceptions of the benefits of sport. The communities visited ranged from those in major urban areas to isolated outback communities.

The report uses various case study examples of existing sporting competitions and the results of personal interviews to explore the role of sport in Aboriginal society against the broader context of social disintegration in these communities. Based on these findings the author concludes that sport plays an extremely important role in Aboriginal communities as a means of enhancing social cohesion, improving self esteem, reducing the incidence of violence, delinquency and suicide, and by providing a system of social support. Using sporting "carnivals" such as the Yuendumu games, the author also shows how sport can act as a facilitator for encouraging particularly the younger generations to become involved in the preservation of more traditional Aboriginal cultural components and beliefs. However, while the perceived benefits of sporting programs in such communities are readily acknowledged, the author concedes that broader change in social policy, administration and funding is needed to address the many problems which such communities face. Befitting the nature of this study, the focus of this report is on discussing the results of the case studies and personal interviews in the context of the broad community benefits to be gained from sporting programs, rather than on the presentation of detailed statistical data.

This study is also discussed in the publication *Obstacle Race: Aborigines in Sport* by the same author. *Obstacle Race* takes a broader focus than *Aborigines: Sport, Violence and Survival*, discussing "the historical, political and sociological experience of Aborigines between 1850 and 1994, as mirrored by the lives of Aboriginal and Islander sports men and women."

xxiv. Williams, P. and Lord, S.R. (1997) "Effects of Group Exercise on Cognitive Functioning and Mood in Older Women", Australia and New Zealand Journal of Public Health, Vol. 21, No. 1, pp. 45-52.

Impact: personal well-being, mood
Population: aged females
Methodology: multivariate quantitative
Country: Australia

Authors' abstract

A randomised controlled trial was conducted to determine whether a 12-month program of group exercise had beneficial effects on physiological and cognitive functioning and mood in 187 older community-dwelling women. The exercisers (n = 94) and controls (n = 93) were well matched in terms of test measures and a number of health and life-style assessments. The mean number of classes attended by the 71 exercise subjects who completed the program was 59.0 (range 26 to 82). At the end of the trial, the exercisers showed significant improvements in reaction time, strength, memory span and measures of well-being when compared with the controls. There was also an indication that anxiety had been reduced in the exercisers. Within the exercise group, improvements in memory span were associated with concomitant improvements in both reaction time and muscle strength. Also, within this group, initial mood measures were significantly inversely associated with improvements at retest, which suggests that the program may have normalised mood states in subjects who had high initial depression, anxiety and stress levels, rather than inducing improvements in all subjects. These findings suggest that group exercise has beneficial effects on physiological and cognitive functioning and well-being in older people.

Additional comments

A sample of older women who took part in the initial phase of the Randwick Falls and Fractures Study from 1988-1991 were included in this study. Subjects were randomly assigned to either a control or exercise group before they were recruited to participate. Although 187 participants took part in this study, complete data were available for 71 participants in the exercise group and 78 in the control group. All subjects were aged over 60 years (mean age for exercisers = 71.8; mean age for controls = 71.6).

Subjects in the exercise group participated in an existing community based program which included aerobic, coordination and muscle strengthening exercises. The program followed the NSW State schools timetable with four terms of 10-12 weeks and school holidays in between. Subjects attended one-hour exercise sessions twice weekly during the school terms and were instructed to maintain exercise activities during the holidays. The control group did not participate in any organised activities.

A number of physiological and psychological assessments were conducted prior to commencement of the exercise trial and following completion of the 42-week program. The psychological assessments included measures of cognitive function and mood. The Digit Span and Picture Arrangement subtests of the Wechsler Adult Intelligence Scale - Revised (WAIS-R) and Cattell's Matrices were used to measure cognitive functions. The Depression, Anxiety and Stress Scale (DASS) was also applied. In addition, following the completion of the program, participants completed a subjective well-being measure which obtained self-reports of improvements in fitness, health, sociability, mood and outlook as a result of participating. There were no statistically significant initial differences between the exercise

and control groups on any of the health or life-style measures. Repeated measures MANOVA techniques were used to assess the effects of exercise on mood and cognitive function.

The results of this study indicate that statistically significant improvements in cognitive function and subjective well-being were greater for the exercise group than the control group. Statistically significant improvements in the digit span test and the subjective well-being measures of general health, general fitness, sociability, mood and outlook were observed for the exercise group while control subjects reported little change in these measures. However, no significant differences between the groups on the DASS measure of mood were observed. The authors suggest that the DASS may not be an adequate measure of psychological improvements following exercise participation. There were no significant improvements in the picture arrangement or matrices tests after 12 months of exercise. The authors acknowledge that causality can not be concluded from this research and that social interaction associated with the group exercise program employed may account for the positive findings.

4. International References

1. Allen, L.R. (1991) "Benefits of Leisure Services to Community Satisfaction". In Driver, Brown and Peterson, Benefits of Leisure, pp331-350, Venture Publishing Inc., State College, Pennsylvania.

Impact:	community pride/identity
Population:	general population
Methodology:	literature review
Country:	USA, Australia

Author's abstract not provided

Additional comments

This article discusses the association between recreation and leisure services and community satisfaction. It begins with a detailed theoretical discussion of what is meant by concepts such as 'community', 'quality of life' and 'community satisfaction', concluding that quality of life is a factor of personal satisfaction, neighbourhood satisfaction and community satisfaction. The author proposes that community satisfaction involves both a cognitive (rational) and affective (emotional) assessment of existing community services and attributes in addition to a psychological sense of community promoted by factors such as social networking, bonding and residential control.

In an attempt to investigate links between recreation and leisure services, and community satisfaction the author reviews a large number of articles relating to this topic (the vast majority originating from the United States), most of which date from the late-1970s or early to mid-1980s. Their review revealed little empirical evidence to support the claim that recreation and leisure services are a major factor in community satisfaction. The bulk of the studies investigated identify factors such as 'life essentials' (e.g. health, employment, housing) and social aspects (e.g. closeness to friends, quality of family life) as the key indicators of an individual's community satisfaction. The author concludes that while "the role of recreation and leisure services in addressing the elements of a good community have not been substantiated by empirical research", there is a sound philosophical basis suggesting this. However, specific research focusing on recreation and leisure is required to support this claim. In addition, the evidence reviewed does not appear to consider the added benefits to community satisfaction that recreation and leisure services can provide independently of other factors. This can also be clarified by further research.

2. Berger, B.G. & Owen, D.R. (1992) "Preliminary Analysis of a Causal Relationship Between Swimming and Stress Reduction: Intense Exercise May Negate the Effects", International Journal of Sport Psychology, Vol. 23, pp. 70-85.

Impact: mood
Population: college students
Methodology: multivariate quantitative
Country: USA

Authors' abstract

This study explored the relationship between swimming and the reduction of psychological stress (N = 74). College students serving as their own controls (N = 36) were randomly assigned alternately to a swimming or record-keeping activity in the pool area. The stress reducing influences of class atmosphere, student interaction, and time away from the classroom were identical in both swimming and the control activity of keeping records. Inclusion of a lecture-control class (N = 38) provided information about possible seasonal and testing effects. Participants completed the State Anxiety Inventory and the Profile of Mood States (POMS) before and after each activity. In practical support of the "time out" hypothesis, women reported less anxiety after class regardless of whether they swam or kept records. Men reported no changes in anxiety. Record keepers tended to report a bigger decrease in anxiety during week 6 than week 13. Thus, record keeping might have lost some of its appeal on the second occasion. Swimmers reported short-term increases in Fatigue, the only significant mood change on the POMS. Exercise heart rates averaged 81% of age-adjusted maximum heart rate; they swam more intensely than recommended. Fatigue might have negated the psychological benefits of exercise. These preliminary results suggested that exercisers who wish psychological benefits should avoid high intensity exercise.

Additional comments

The sample in this study consisted of 74 undergraduates who were voluntarily enrolled in one of two coeducational intermediate swimming courses or an introductory health science course. A total of 36 students were enrolled in swimming classes (n's = 20 and 16) and 38 were enrolled in the lecture control class. While the swimming classes included only 7 women, 21 women were enrolled in the health science course.

Students in the swimming classes were randomly assigned to either a swimming or record-keeping activity for the initial week of the program but participated in alternate activities each week after that. The swimming classes lasted for 50 minutes and were held twice a week throughout the 15 week semester. Heart rate was monitored during the swimming session in order to maintain a moderate intensity of exercise. Subjects in the lecture control group attended 50 minute health science lectures on three days a week.

All subjects completed a Demographic Screening Inventory, the State Trait Anxiety Inventory and the Profile of Mood States (POMS) before commencing the program. The Lie Scale of Eysenck's Personality Inventory was also administered to measure the likelihood that respondents would honestly answer questions about how they were feeling. Measures of mood and state anxiety were assessed on a further two occasions: after 6 weeks of the program and again after 13 weeks. The Profile of Mood States (POMS) was used to measure mood changes while the State Anxiety Inventory measured short-term change in anxiety levels. The POMS included the six subscales of Tension-anxiety, Depression-dejection,

Anger-hostility, Vigour-activity, Fatigue-inertia and Confusion-bewilderment. A 5-way ANOVA was conducted to investigate the state anxiety data while a 5-way MANOVA explored data obtained on the six mood subscales. Preliminary testing revealed no significant difference in initial mood or anxiety measures between the groups.

The results for analyses of the state anxiety data indicated a significant difference between the lecture and swimming classes, with members of the swimming class being more inclined to report decreases in anxiety than members of the lecture class. However, no significant overall differences were found within the swimming classes on the basis of activity (swimming or record keeping), although swimmers were more inclined to report decreases in anxiety nearer the end of the treatment period, while in contrast record keepers were more likely to report decreases in anxiety earlier in the treatment period. A number of significant gender differences were identified in these analyses with women demonstrating a decrease in state anxiety levels over time regardless of which activity they participated in. On the other hand men reported little change in anxiety levels over time. No significant effects were observed for the Profile of Mood States, except for the Fatigue subscale which increased with participation in the swimming class. The authors conclude that the exercise undertaken in this study was more intense than originally planned and suggest that in the case of novice athletes, high exercise intensity may negate many of the psychological benefits normally associated with participation. It is acknowledged that the use of intact groups limits the interpretation of results.

3. Berger, B.G. & Owen, D.R. (1992) "Mood Alteration with Yoga and Swimming: Aerobic Exercise May Not Be Necessary", Perceptual and Motor Skills, Vol. 75, pp. 1331-1343.

Impact: mood
Population: college students
Methodology: multivariate quantitative
Country: USA

Authors' abstract

The mood benefits of Hatha yoga and swimming, two activities that differ greatly in aerobic training benefits, were examined. College students ($N = 87$) in two swimming classes, a yoga class, and a lecture-control class completed mood and personality inventories before and after class, and a lecture-control class completed mood and personality inventories before and after class on three occasions. A multivariate analysis of variance indicated that both yoga participants ($n = 22$) and swimmers ($n = 37$) reported greater decreases in scores on Anger, Confusion, Tension, and Depression than did the control students ($n = 28$). The consistent mood benefits of yoga supported our earlier observation that the exercise need not be aerobic to be associated with mood enhancement. However, underlying and causal mechanisms remain uncertain. Among the men, the acute decreases in Tension, Fatigue, and Anger after yoga were significantly greater than those after swimming. Yoga may be even more beneficial than swimming for men who personally select to participate. It seems that aerobic exercise may not be necessary to facilitate the mood benefits. Also, students with greater mood changes attended class more regularly than those who reported fewer psychological benefits. Maximizing the immediate psychological benefits of exercise might be one way to encourage adults to be physically active.

Additional comments

Although the sample in this study was initially comprised of 101 college students, the final sample used for the analyses consisted of the 87 subjects for which complete data were obtained. Subjects voluntarily enrolled in one of two swimming classes (n 's = 20 & 17), a yoga class ($n = 22$) or a health science lecture control course ($n = 28$).

Subjects in the swimming and yoga classes participated in a total of 60 minutes of exercise per week for a period of 12 weeks. Those in a swimming class attended two sessions a week, while those in the yoga class attended only one session per week. The control subjects attended a 50 minute lecture on three days a week. Participants in the exercise groups were encouraged to participate in additional exercise outside of their class times.

The dependent variable of interest in this study was mood. This was assessed by the Profile of Mood States which consists of 6 subscales measuring Tension-anxiety, Depression-dejection, Anger-hostility, Vigour-activity, Fatigue-inertia and Confusion-bewilderment. The Eysenck Personality Inventory Lie Scale and the State-Trait Anxiety Inventory were used to investigate initial group differences. Age, gender and initial mood and anxiety scores were assessed on the first day of class for both exercise and control groups. The Profile of Mood States was administered immediately before and after class on a further three occasions corresponding to the beginning, middle and end of semester (second day, week 6 and week 12). The anxiety inventory was measured on two of these occasions (second day and week 12) as a further measure of mood change. One way ANOVA and Chi-square analyses were used to investigate the equivalence of the classes. The relationship between variables was examined with Multivariate Analysis of Variance.

Results suggest that exercise does not have to be aerobic to be associated with psychological benefits as improvements in mood were demonstrated by both the swimming and yoga classes. Participants in the exercise groups reported greater decreases in Anger, Confusion, Tension and Depression than the control group, although no differences were obtained for the Vigour and Fatigue scales. It was also found that males and females differed in the benefits reported. While the mood effects for females were similar for swimming and yoga, males reported significantly greater benefits from yoga than swimming with greater decreases on Tension, Fatigue and Anger. The authors acknowledge that the self-selected groups used in this study may limit the conclusions that can be made from this research but suggest that voluntary participation in exercise reflects a more accurate view of the participation "outside the laboratory". In addition, despite efforts to reduce expectation related outcomes, the fact that subjects were informed about the purpose of the experiment at the outset could be a contributing factor to the observed results.

4. Berger, B.G., Owen, D.R. & Man, F. (1993) "A Brief Review of Literature and Examination of Acute Mood Benefits of Exercise in Czechoslovakian and United States Swimmers", International Journal of Sport Psychology, Vol. 24, pp. 130-150.

Impact: mood
Population: female college students
Methodology: multivariate quantitative
Country: USA, other (Czechoslovakia)

Authors' abstract

This study briefly reviewed the exercise and mental health literature and then examined the influence of national differences on the acute mood benefits of swimming. Women college students (N = 70) from Czechoslovakia and the United States who were enrolled in swimming and lecture-control classes completed the Profile of Mood States before and after class on three occasions. Results of a 4-way MANOVA confirmed that, as predicted, swimmers in each of the two countries reported acute mood benefits and that there were national differences in the extent of the changes. In comparison with their respective controls, Czechoslovakian swimmers reported greater mood changes than the U.S. swimmers; differences between the two control groups contributed greatly to these interactions. Analyses of only the swimmers' scores indicated that Czechoslovakian and U.S. swimmers reported mood improvement on Tension, Depression, Anger, Vigor, and Confusion. Results supported the possibility that swimming is associated with mood benefits and that the effects occur across cultures.

Additional comments

This article consists of 2 sections; a brief review of the exercise and mental health literature and a report on a study investigating the mood benefits of exercise. The sample used in the study consisted of female students from a teachers college in Czechoslovakia and a large metropolitan college in the United States who were in a beginning swimming class or a lecture-control class. Complete data for the three phases of testing was available for a total of 70 students. The four intact classes used as the treatment groups were: Czechoslovakian swimmers (n = 15), Czechoslovakian controls (n = 20), U.S. swimmers (n = 20) and U.S. controls (n = 20).

Czechoslovakian swimmers attended one session per week for a 12 week period while U.S. swimmers met twice a week for a 14 week semester. Although the duration of the individual sessions was different, the total swimming time of 60 minutes each week was the same in each group. Czechoslovakian students in the lecture-control group attended one 90-minute lecture per week while those in the U.S. class met three times a week for 50 minute lectures .

The Profile of Mood States (POMS) was used to measure the mood of the U.S. groups. This included the subscales of Tension, Depression, Anger, Vigour, Fatigue and Confusion. A Czech adaptation of the POMS, slightly modified to correspond with sociocultural aspects of Czechoslovakia, was administered to the Czechoslovakian students. Students in both the exercise and control groups completed the POMS before and after class on three occasions: the second day of class, mid-semester and at the end of the semester. A 2-way ANOVA examined the initial POMS scores for pre-existing group differences. Relationships between variables were explored using a 4-way MANOVA.

The results of this study provide support for the mood benefits of swimming. Swimmers reported significantly greater improvements in mood than controls in both the Czechoslovakian and the United States samples. Although the Czechoslovakian swimmers reported greater reductions on the Tension subscale, both groups reported significantly less Tension, Depression, Anger and Confusion and considerably more Vigour after swimming than before. There appeared to be some national differences in the relative benefits of swimming in comparison to the control, however it is suggested that differences in mood change reported by the lecture-control groups would account for this finding; the U.S. controls reported similar (but less pronounced) benefits in mood to the swimmers while the Czechoslovakian control group reported negative changes in mood. It was concluded that despite the differing duration and frequency of the swimming sessions in the two countries, there were similarities in the positive effects of swimming on participants' mood. The authors acknowledge that care should be exercised when generalising this research to other populations due to the non-random group assignment used and suggest that further research into the cross cultural influences on the mood-exercise relationship is required.

5. Biddle, S. (1993) "Children, Exercise and Mental Health", International Journal of Sport Psychology, Vol. 24, pp. 200-216.

Impact: personal well-being, mood, self-esteem
Population: children
Methodology: literature review
Country: UK, USA, Canada

Author's abstract

There is a growing awareness in advanced industrialised societies that physical activity can make a significant contribution to health promotion and disease prevention. However, despite the widely held belief that healthy behaviours should be initiated in childhood, the research efforts have concentrated primarily on adults. This paper provides a summary overview of what is currently known about selected psychological aspects of children, exercise and health, with reference to issues associated with mental health.

Additional comments

This article discusses a number of potentially beneficial outcomes of physical activity and exercise for children, particularly in relation to mental health, and also discusses measures to increase physical activity participation amongst children. The author reviews a number of articles, some experimental in nature, from the mid 1980s.

The research available on the effects of physical activity on children's mental health suggests that children are not immune to psychological problems, although the sources of such problems are likely to be different to adults. Various studies are discussed which show links between physical activity participation and mental and physical health. For example one study found that illness was associated with stress, but was significantly mediated by both aerobic and anaerobic exercise. Negative effects that may result from involvement in physical activity are also discussed. These include eating disorders and stress derived from competitive sport.

The author notes the lack of research on the beneficial effects of physical activity on the mental health of children and emphasises the need for more research in this area, in particular longitudinal data. Consequently most of the research reviewed focusses on the adult population and it is assumed that the benefits identified can also be expected of children's participation.

6. Bluechardt, M.H. & Shephard, R.J. (1995) "Using an Extracurricular Physical Activity Program to Enhance Social Skills", Journal of Learning Disabilities, Vol. 28, No. 3, pp. 160-169.

Impact: social behaviour, development of life skills
Population: boys and girls with learning disabilities
Methodology: multivariate quantitative
Country: Canada

Authors' abstract

The value of an individually supervised physical activity program with a strong social skills component was examined for 45 students with learning disabilities (34 boys, 11 girls; mean age = 9.4 ± 1.1 years). Subjects were randomly divided into an experimental group of 23 students who received two 90-minute exercise sessions for each of 10 weeks, and a control group of 22 students who received equal individualized attention through extra academic instruction. Scores for the Bruininks-Oseretsky test of motor proficiency, teacher ratings of social behaviour, and self-perceptions of academic and non-academic competence showed strong effects of time, but not substantial time X treatment interaction. Time effects on social behaviours persisted 3 months following treatment, suggesting that they reflected extra attention, rather than an expectancy, or halo, effect. There would seem to be merit in further exploring the value of extra attention, which here was provided to students with learning disabilities by volunteers with limited formal training.

Additional comments

A sample of 34 boys and 11 girls (mean age = 9.4 years) with learning disabilities and previously identified deficiencies in one or more areas of social behaviour volunteered to participate in this study. The final sample used in analyses consisted of 43 students. All were residents of Peterborough in southern Ontario.

Participants were randomly assigned to either the experimental (n = 21) or control (n = 22) groups. Twenty six trained instructors were assigned 2 students each to supervise for the duration of the project. The 10-week experimental program involved two closely supervised extracurricular physical activity sessions per week which combined vigorous physical activity with training in social skills and problem solving. Each session lasted for 90 minutes with 70 minutes dedicated to physical activity. The two sessions each week were based on pool and gymnasium activities respectively. The control group received the same amount of close supervision and individual attention by attending two 90 minute periods of academic instruction each week for the 10-week treatment period. During these classes students were assisted in academic skills such as reading, writing and spelling.

The Bruininks-Oseretsky Test of Motor Proficiency was used to assess participants gross and fine motor skills. Subjects were asked to rate their own competence in a number of academic and non-academic areas such as general intellectual ability, social acceptance, physical appearance and a general self-worth rating and were asked to rate the importance of each domain to them as individuals. The students' regular classroom teachers used the Context-Based Test of Social Skills to record their observations of students' social behaviour. Subjects in the experimental condition were also asked to rate their performance (physical and social) during swimming and gym sessions using a three-level scale (ranging from a happy to a sad face) and to give their reasons for these ratings. Information relating to participation in other extracurricular activities was collected from parents/guardians. Initial

levels of motor performance, self-perceptions and social skills were obtained before the commencement of the program and again after 10 weeks. A further assessment of social behaviours was conducted 3 months later. Data was examined with a split-plot factorial Analysis of Variance and correlational analyses.

The results of this study indicate that improvements in motor performance and social skills were obtained by those who participated in the extracurricular physical activity program. However, similar improvements were demonstrated in control subjects. It is therefore suggested that the individual attention and personal support which was provided to both groups of learning disabled subjects may have led to the benefits obtained, regardless of whether this was provided in the context of physical activity or an academic learning program.

7. Branscombe, N.R. & Wann, D.L. (1991) "The Positive Social and Self Concept Consequences of Sports Team Identification", Journal of Sport and Social Issues, Vol. 15, No. 1, pp. 115-127.

Impact: social cohesion, mood, self-esteem, community
pride/identity
Population: college students, spectators
Methodology: multivariate quantitative
Country: USA

Authors' abstract

As a result of increased geographic mobility, industrialisation, and the like, traditional social and community ties have declined. Conversely, sports spectatorship has continued to flourish. We argue that strong identification with a specific sports team provides a buffer from feelings of depression and alienation, and at the same time, fosters feelings of belongingness and self worth. In effect, sports team identification replaces more traditional family and community-based attachments to the larger social structure. Three studies find support for these notions, using basketball and baseball fans. The relationship between degree of team identification and team success was also examined; it was only significant for individuals who identify with teams geographically removed from themselves. Discussion focuses on the positive implications of sports team identification for self-esteem maintenance and the social ties it creates.

Additional comments

This article reports on the findings of three studies, each with separate samples of undergraduate students from Kansas university. The first study involved 76 males and 111 females, the second study included 171 males and 190 females and the third consisted of a sample of 155 males and 177 females.

Study 1 involved the administration of a self-esteem scale (Hoyle, 1987), the Crowne-Marlow social desirability measure and a sports team identification measure developed by the authors in a previous study. Frequency of experiencing depression was also assessed along a scale from 1 (never) to 8 (always). The University of Kansas Men's Varsity Basketball Team was used as the object of identification. Correlations between the measure of identification with a sports team, self esteem, frequency of depression and social desirability were performed.

The second study also used the sports team identification measure for the University of Kansas Men's Varsity Basketball Team. In addition, an emotional experiences questionnaire and an alienation measure were administered. Factor analysis using varimax rotation was performed on the emotional experiences questionnaire and three factors were identified: positive emotions (life satisfaction and happiness), negative affect (e.g. sad, regretful, hopeless) and anxiety. Correlational analyses addressed the relationship between these factors, the alienation variable and the sports identification measure.

Study 3 asked participants to indicate their favourite Major League Baseball team and to complete the sports team identification measure for that team. They also indicated how long they had been a fan of that team and the frequency of depression experiences (as in Study 1). Team records were used to rank the 26 baseball teams based on their win/loss ratio. As for the previous studies, correlational analyses examined the relationship between variables. Further analyses also investigated the differences between short term and long term fans and

whether a team's winning percentage was related to the strength of team identification.

In summary, the results of the three studies suggest that high identification with a sports team elevates self-esteem and positive affect and may have a buffering effect against depression, alienation and other negative emotions. For fans of geographically distant teams (but not for local teams) the team's win/loss record was related to the degree of team identification. However, short term fans were no more likely to be involved with successful teams than long term fans. Although this study suggests a number of benefits of identification with a sports team, it is important to consider some methodological issues. Although a number of the correlations were found to be significant, the magnitude of the relationships were modest (for example, the correlation between sports identification and self esteem was only .13 but significant). Conclusions from correlational studies are also limited as the causal direction of the relationships can not be determined. Sports team identification may not have contributed to self esteem at all, results could merely suggest that those with higher levels of self esteem identify more strongly with sports teams. Therefore, while this study provides some evidence for both social and personal benefits of sports team identification, the correlational nature of these studies should be considered when interpreting the results.

8. Brown, S.W., Welsh, M.C., Labre, E.E., Vitulli, W.F. & Kulkarni, P. (1992) "Aerobic Exercise in the Psychological Treatment of Adolescents", Perceptual and Motor Skills, Vol. 74, pp. 555-560.

Impact: mood, development of life skills
Population: adolescents with mental disabilities
Methodology: multivariate quantitative
Country: USA

Authors' abstract

A small group of psychiatrically institutionalised adolescents (16 boys, 11 girls) were assigned to a three-day-per-week running/aerobic exercise program or a regular physical activity class. The complete program continued over 9 weeks, with 11 subjects remaining throughout the program. Dependent measures of body-mass index, timed performance on a one-mile run, resting, exercise, and recovery heart rates, and measures of depression, mood-states, and self-efficacy were assessed pre-, mid-, and post-9-week treatment and at a 4-week follow up. Improvements in depression, anxiety, hostility, confused thinking, and fatigue were shown in treated girls, with increases in vigor and self-efficacy for all treated subjects.

Additional comments

Twenty seven adolescent in-patients (16 boys, 11 girls; mean age = 15.6 years) from a private psychiatric facility comprised the sample in this study. A number of participants were discharged from the facility during the treatment intervention with the result that complete data was only available for 11 of these participants.

All persons selected in the sample were already participating in regular physical education classes. Subjects were randomly assigned to either the treatment (11 boys, 6 girls) or control condition (5 boys, 5 girls). Subjects in the treatment classes participated in 3 days per week of running/aerobic exercise over a 9 week period and continued with regular physical education classes on other days. Those in the control condition continued to participate in regularly scheduled Physical Education classes during the 9 week program. Assessments of physiological and psychological measures were conducted prior to the program, mid-program (4.5 weeks), upon completion of the program (9 weeks) and 4 weeks later. Psychological assessments included the Beck Depression Inventory (BDI), the Profile of Mood States (POMS) and a Self-Efficacy Questionnaire developed by one of the authors. An activities questionnaire which measured participation in athletics and self-reported fitness levels was also administered. Data was analysed using factorial MANOVA procedures.

The results of this study indicate that girls who participated in the exercise program showed decreased depression and anxiety while both boys and girls who participated in the exercise program reported improvements in anger, vigour and feelings of self-efficacy relative to the control group. These changes were evident at both mid-program and end of program assessments but had disappeared by the 4 week follow up. The small sample size and loss of subjects during the treatment period limit the conclusions that can be made from this study.

9. Calfas, K.J. & Taylor, W.C. (1994) "Effects of Physical Activity on Psychological Variables in Adolescents", Pediatric Exercise Science, Vol. 6, pp. 406-423.

Impact: personal well-being, self-esteem, mood
Population: adolescents
Methodology: literature review
Country: USA

Authors' abstract

To identify the most consistent relationships among psychological variables and physical activity in youth (ages 11-21 years), 20 articles on depression, anxiety, stress, self-esteem, self-concept, hostility, anger, intellectual functioning, and psychiatric disorders are reviewed. Physical activity was consistently related to improvements in self-esteem, self-concept, depressive symptoms, and anxiety/stress. The effect sizes were +.12, -.15, and -.38 for self-esteem/self-concept, stress/anxiety, and depression, respectively. The evidence for hostility/anger and academic achievement was inconclusive. No negative effects of physical activity were reported. The literature suggests that physical activity in youth is psychologically beneficial. More research is needed to confirm previous findings. Adolescents should engage in moderate or vigorous aerobic activity approximately three times per week for a total of at least 60 minutes per week.

Additional comments

This paper reviews a number of studies (dating mainly from the 1980s) that focussed on physical activity or exercise and selected psychological variables of particular relevance to adolescent youth. A comprehensive description of the characteristics of each of the studies is included.

Over half of the twenty studies reviewed were experimental in nature and most compared a fitness program to a no/low activity group. The authors calculated effect sizes for a number of these studies, in effect a summary measure which compares control and treatment group means. The authors find moderate support for the existence of a positive relationship between physical activity and various psychological outcomes, in particular, an increase in self-esteem and a decrease in stress/anxiety and depression. Very little evidence was available which explores links between physical activity and hostility/anger or academic achievement/intellectual functioning. Although no studies reported negative effects of physical activity the potential for this is mentioned.

The authors note a general lack of experimental research on the psychological effects of physical activity among adolescents (11-21 years), in particular in relation to which characteristics (duration, type) of physical activities are most important to improve mental health. Numerous methodological limitations were mentioned in this review including the limited use of control groups; conclusions based on small sample size; psychological variables measured in different ways and not appropriate for the age group; and the use of homogeneous groups which makes generalisation to other ethnic and socioeconomic groups difficult.

10. Canadian Parks/Recreation Association (1997) The Benefits Catalogue, Gloucester.

Impact:	personal well-being, self-esteem, mood, social behaviour, crime prevention, development of life skills, social cohesion, community identity/pride
Population:	general population, children, aged, youth-at-risk
Methodology:	literature review
Country:	Canada, USA

Author's abstract not provided

Additional comments

This catalogue focuses on identifying the individual, social, economic and environmental benefits associated with recreation, sports, fitness, arts, culture and parks. The primary interest is in reviewing literature which reports the results of empirical research. A comprehensive range of literature is referenced, dating mainly from the 1980s and early 1990s.

A wide range of benefits are identified. The catalogue is structured around 44 benefit or outcome statements organised under 8 broad categories: essential to personal health (contributes to overall physical health and psychological well-being); the key to human development (assists in intellectual development and promotes improved motor and social skills); essential to quality of life (builds self-esteem and feelings of independence, enhances life satisfaction levels); reduces anti-social behaviour (associated with reductions in negative social activity, including crime and racism); builds strong families and healthy communities (promotes social cohesion through improved social skills and increased community involvement, develops leadership); reduces health care and social services costs, a source of economic growth; and of key ecological importance. For each benefit, key statements and findings are listed from the body of research investigated.

The overall picture presented is very positive, with a range of supporting statements provided for each of the 44 benefits identified. It should however be noted that little attempt is made to evaluate the quality of the evidence presented and it is unclear whether the methodological limitations associated with much research in this area has been taken into account. In addition it is unclear whether negative outcomes potentially associated with some types of participation (e.g. increased aggression, higher propensity for risk-taking behaviour) have been considered. The primary purpose of the Catalogue is to provide people working in the industries in question with a 'toolbox' of potential benefits and focus attention on future outcomes. It is acknowledged that in the past the sporting sector (and other leisure related industries) may not have fully delivered on the potential benefits which the Catalogue describes.

11. Coalter, F. , Allison, M. and Taylor, J. (2000) The Role of Sport in Regenerating Deprived Urban Areas, The Scottish Executive Central Research Unit, Edinburgh. Summary of findings available online at www.scotland.gov.uk/cru/resfinds/df86-00.asp [November 2000].

Impact:	personal well-being, crime prevention, development of life skills, social behaviour, social cohesion
Population:	residents of deprived urban areas, youth-at-risk, minority groups
Methodology:	literature review, qualitative
Country:	UK

Authors' abstract not provided

Additional comments

This report investigates evidence of the role of sport in urban regeneration, with a particular focus on the contribution of sport to the reduction of youth crime and community development. Published and unpublished literature, mainly from the mid 1990s, is reviewed in addition to the results of ten case studies which focus on persons involved in specific programs.

The overall conclusion is that sporting programs can be effective in support of urban regeneration. However, as a result of limitations in existing programs, including lack of focus, lack of sufficient evaluation, and lack of integration into broader social programs, sporting programs have not necessarily delivered the range of benefits originally envisaged.

Evidence suggests that sporting programs may be effective in crime prevention over the short-term, mainly as a diversionary factor for youth at risk and as a means of improving self-esteem. The most successful programs were found to be those which involve non-competitive participation, have minimal formal rules and regulations and involve youth in the decision making process. However, little research has been conducted to measure the long-term benefits of such programs and in studies where this has been the case the results are generally inconclusive. There has been a general lack of data evaluating the effectiveness of sport based crime prevention programs, and previous programs are criticised as lacking clear objectives and a sound theoretical basis. It is suggested that such programs can be of value, but only as part of a broader strategy incorporating other aspects of personal development such as education, employment skills and health awareness.

The evidence supporting the role of sport in broader community development, including as a factor in improved educational outcomes for young people and as an assistance to the problems faced by minority communities, is inconclusive. Again, it is claimed that it is those programs which actively involve members of the target group in design and organisation, and which form part of broader urban regeneration strategies, that are more likely to show positive results.

12. Collingwood, T.R., Reynolds, R., Jester, B. & Debord, D. (1992) "Enlisting Physical Education for the War on Drugs", JOPERD, Vol. 63, No. 2, pp. 25-28.

Impact: self-esteem, personal well-being, social behaviour
Population: youth at risk
Methodology: multivariate quantitative, program evaluation
Country: USA

Authors' abstract not provided

Additional comments

This article discusses the development of a pilot physical fitness program trailed in the Hurst, Euless, Bedford Independent School District of Texas which aims to use physical activity as a means of diverting teenagers from substance abuse. The program consists of two elements; one aimed at students enrolled in junior high schools and the other (Keys At Risk program) directed at youth in the district who are classified as "at-risk"(e.g. drop-out, psychological problems, teen pregnancy, substance abuse). The focus of this paper is primarily on the Keys At Risk program, which is evaluated using pre- and post-program data from 54 "at risk" students (34 males, 20 females). All students involved in the Keys At Risk program voluntarily enrol through their school counsellor.

A physical fitness program was integrated into semester physical education classes for the two classes of participants. The program consisted of a fitness class on at least 2 days a week for 12 weeks and included physical activities, education and discussion. Each class lasted for an hour and included 40 minutes of actual physical activity (walking/running and callisthenics). A number of measures were used to evaluate the effects of the program on these youth. Several aspects of fitness were assessed for students in both classes. A written test battery was also administered to assess substance abuse risk factors such as self-concept, anxiety and depression as measured by the General Well-Being Scale, self-report ratings of school functioning, parental relationships, friends' use of drugs, church attendance and arrest record. The Pride Substance Abuse Self-Report measured substance abuse patterns. T-test analyses were used to compare pre- and post measures.

Results suggest that the physical fitness program had a positive influence on both substance abuse risk factors and actual substance abuse patterns. Significant increases in fitness, ratings of self-concept and anxiety were obtained along with significant decreases in multiple drug use. It should be noted that a control group was not included in this study and therefore the relationship between observed improvements and the physical education intervention are not conclusive. Other aspects of the Keys At Risk program during the 12 week intervention period such as education, discussion and peer leadership sessions, may have also had an impact on the results obtained.

13. Cramer, S.R., Nieman, D.C. & Lee, J.W. (1991) "The Effects of Moderate Exercise Training on Psychological Well-Being and Mood State in Women", Journal of Psychosomatic Research, Vol. 35, No. 4/5, pp. 437-449.

Impact: mood, personal well-being
Population: mildly obese adult females
Methodology: multivariate quantitative
Country: USA

Authors' abstract

The relationship between moderate exercise training (five 45 minute sessions/week, brisk walking at $62 \beta \pm 2\% \text{VO}_{2\text{max}}$ for 15 weeks), psychological well-being and mood state was investigated in a group of 35 sedentary, mildly obese women. A 2 (exercise(EX) (N = 18) and non-exercise (NEX) (N=17) groups) x 3 (baseline, 6-week, 15-week testing sessions) factorial design was used with data analyzed using repeated measures ANOVA. Four psychological tests were administered : Daily Hassles Scale (DHS), General Well-being Schedule (GWB), Spielberger State Anxiety Inventory (S-Anxiety), and Profile of Mood States (POMS). The EX and NEX groups had significantly different patterns of change over time for GWB total scores [$F(2,66) = 5.72, p = 0.005$] and the GWB subscales 'energy level' and 'freedom from health concern or worry'. Scores for the EX group were elevated at both 6 and 15 weeks. General well-being total scores and subscale 'energy level' scores were significantly correlated with improvement in submaximal cardiorespiratory fitness ($r = -.041, p = 0.014$; $r = -.040, p = 0.017$, respectively). Exercise training also had a significant effect on frequency but not intensity of DHS scores, and S-Anxiety, with a significant decrease seen in the EX group at 6 weeks but not 15 weeks. Profile of Mood States scores were not significantly related to exercise training. These data support the results of other studies that have reported improvement in general psychological well-being with exercise training.

Additional comments

This study recruited participants through flyers and newspaper advertisements in the area surrounding Loma Linda University. Fifty subjects were selected from responses to these advertisements based on a number of criteria. All participants were 25-45 years old, female, non-smokers, mildly obese and indicated that they were not involved in any exercise programs and were in a current state of good health. Of the fifty who participated, only 35 completed all the required phases of testing and intervention.

Subjects were randomly allocated to either the exercise (n = 18) or control group (n = 17). The exercise group participated in 45 minute supervised sessions of brisk walking at the testing facility on 5 days a week for a period of 15 weeks. Heart rate was monitored to ensure participants maintained a training heart rate of 60% of their heart rate reserve. The control group were instructed to remain sedentary throughout the 15 week period.

A number of psychological, behavioural and physiological measures were obtained from subjects in both the exercise and control groups. The Daily Hassles Scale, General Well-Being Schedule, Spielberger State Anxiety Inventory and Profile of Mood States were employed as measures of psychological well-being. Participants used personal daily log books to record exercise type, duration and distance and any health problems that might have occurred during the 15 week training period. Physiological measures conducted at the Human Performance Laboratory provided an indication of fitness levels. Assessments were

conducted at baseline, after 6 weeks and again after 15 weeks. The data was examined with repeated measures ANOVA and correlational analyses.

The results of this study indicate that improvement in the overall General Well-being measure was greater for those who participated in the exercise program than for the control group. This result was primarily due to the significant improvements over time on the measures of 'energy level' and 'freedom from health concern or worry'. A significant difference between the exercise and control groups was obtained for the Spielberger-Anxiety measure at the 6 week assessment but these effects were not maintained for 15 weeks. A reduction in reported daily hassles was also greater for the exercise group than the control group at 6 weeks but not at 15 weeks. Both the intensity of daily hassles reported and mood states (as measured by the Profile of Mood States) appeared to be unaffected by participation in exercise. While the observed improvements in general well-being were correlated with improvement in fitness in all subjects, changes in anxiety and daily hassles were unrelated to fitness. It should be noted that the sample used in this study was selected on the basis of specific criteria and therefore results are not necessarily representative of the general population.

14. Crocker, P., Fry, D., & McClements, J. (1996) Sporting Participation by Youth and the Quality of Life in Rural Saskatchewan [online] Available www.lin.ca/resource/html/rural.htm [November 2000].

Impact: crime prevention, social behaviour, social cohesion, development of life skills
Population: residents of rural communities
Methodology: qualitative, quantitative
Country: Canada

Authors' abstract not provided

Additional comments

This study examines the relationship between sport and recreation opportunities and various quality of life measures, such as juvenile crime/delinquency and educational status, in nine rural Saskatchewan communities. A combination of qualitative and quantitative methods was used.

Sixty-one personal qualitative interviews were conducted with individuals in the nine communities, including the Mayor, public health nurse, recreation director and school principal. Respondents were asked a series of questions designed to measure their perception of the quality of life in the community and of the various sporting programs in operation. Additional data, including population data, crime statistics, the number of youths registered in sports and the number of facilities available was gathered from various organisations.

For the data comparison, communities were ranked into three categories according to the total number of youth sports participants. The data, in general, indicated that those communities with high sport participation (category 1) reported a lower number of crimes committed by youth. This was supported by the information gathered in interviews with community members. However the data obtained in this study indicated no association between participation in high school sport and educational status.

Methodological limitations should be noted when considering the findings of this study. Firstly the number of interviews conducted was relatively small and the results observed may be specific to the nine rural communities in question. Some participation numbers were estimates rather than actual counts and the fact that the data used related to participants not individuals may have resulted in the over-estimation of sporting involvement, in cases where individuals undertook a number of activities. The analysis of the association between educational status and sports participation may have been influenced by the fact that the data related to different time periods (4 years apart). The correlational nature of this analysis should be considered, particularly in light of the fact that the influence of external factors, such as socioeconomic status appear not to have been considered. They conclude that given these limitations, their database is inadequate to provide definite conclusions regarding sport participation and the quality of life in rural Saskatchewan.

15. Dobosz, R.P. and Beaty, L.A. (1999) "The Relationship Between Athletic Participation and High School Students' Leadership Ability", Adolescence, Vol. 34, No. 133.

Impact: development of life skills
Population: adolescents
Methodology: multivariate quantitative
Country: USA

Authors' abstract

This study examined the relationship between adolescents' participation in athletics and their leadership skills. In a sample of 60 suburban high school students, athletes demonstrated significantly greater leadership ability than did non-athletes (according to their mean scores on the Leadership Ability Evaluation). Female athletes showed greater leadership ability than did male athletes, although the difference between their scores was not statistically significant. The implications of these findings for school athletic programs are discussed.

Additional comments

The sample of 60 students included in this study (mean age = 16.8 years) consisted of 30 athletes (defined as those who competed on an athletic team every year) and 30 non-athletes (those who had never participated in interscholastic athletics) from a high school in Chicago. These participants were randomly selected from a pool of 100 students. Fifteen males and 15 females were included in each subgroup.

The Leadership Ability Evaluation (LAE) was used to measure leadership skills. An additional questionnaire was administered to collect information relating to athletic participation. Independent t-tests were used to examine the differences between athlete and non-athlete groups and males and females.

Results indicated that athletes had greater leadership ability than non-athletes. It was also found that females and males did not differ significantly in their leadership ability. Although this evidence suggests that athletic participation may assist in the development of leadership skills in both males and females, the relatively small sample size in each group somewhat limits the generalisability of results. Similarly, the sample used is from one specific high school in Chicago and may not be representative of adolescents in general. It should be noted that these findings do not necessarily indicate that sports participation is of benefit in developing leadership skills, merely that those who participate display greater leadership abilities. It is possible that factors associated with leadership such as self-confidence and dominance may in themselves be associated with sports participation.

16. Emery, C.F. & Blumenthal, J.A. (1990) "Perceived Change Among Participants in an Exercise Program for Older Adults", The Gerontologist, Vol. 30, No. 4, pp 516-520.

Impact: personal well-being, mood, self-esteem
Population: aged
Methodology: multivariate quantitative
Country: USA

Authors' abstract:

Data regarding perceived change were collected as part of a study of the effects of aerobic exercise training on psychological, cognitive, and physiological functioning among 101 healthy older adults. Subjects were assigned randomly to an aerobic exercise group, a yoga control group, or a waiting list group for 16 weeks, after which all subjects participated in aerobic exercise for another 16 weeks. Exercise participants perceived positive changes in a wide range of significant life areas, and perceived improvement was more closely related to objective improvement for physiological indicators than for indicators of cognitive functioning or psychological well-being.

Additional comments

One hundred and thirteen older adults were recruited for this study through advertisements in local newspapers and on radio programs. However, 12 were disqualified due to health problems or external commitments, leaving a sample of 101 healthy adults (50 men and 51 women) ranging in age from 60 to 83 years (mean age = 67 years).

Participants were randomly assigned to either the aerobic exercise, yoga control or waiting list control group. The aerobic exercise group (n = 31) took part in 3 sessions of 60 minutes of supervised exercise each week for a period of 16 weeks. Each session involved a 10 minute warm up/stretch, 30 minutes on a stationary bike (increased from 10 minutes by 2 minutes each session over 4 weeks), 7-8 minutes brisk walking or jogging, a further 7-8 minutes of arm ergometry, and a 5 minute cool down/stretch. The yoga control group (n = 34) participated in two 60 minute classes of yoga each week for 16 weeks. Those in the waiting list control group were instructed to maintain their usual activity pattern but not engage in any exercise for the 16 week period.

Assessments of both physiological and psychological measures were conducted before the program started (time 1) and after the 16 weeks of training (time 2). All subjects were then asked to participate in a further 16 week aerobic exercise training program and further assessments were conducted at the end of the training period (time 3). Although the study formally ceased at this point, subjects were encouraged to participate in a further 6 months of exercise treatment following which a further assessment of the measures of interest was made for all participants. Cognitive functioning was measured by a battery of neuropsychological tests including the digit symbol and digit span subtests of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) and the Trail Making Test. Psychological well-being was assessed by the Centre for Epidemiological Studies Depression Scale (CES-D), the Bradburn Affect Balance Scale and a Perceived Change Scale which measured 19 dimensions of social, psychological and physical functioning (e.g. overall health status, sleep patterns, energy levels). Analysis of Variance was used to investigate changes in perceived measures for subjects over time and on the basis of gender and group. Correlational analysis was also used to examine the relationship between perceived and objective change.

It was found that subjects participating in 16 weeks of either aerobic exercise or yoga reported perceived improvements in a number of areas including sleep patterns, self-confidence, social life, loneliness, family relations and sex life. However, while perceived improvements were related to objective measures of improvement in physiological variables (e.g. weight, physical endurance), they were not consistent with the objective improvements measured for psychological well-being (mood) and neuropsychological functioning (e.g. memory and concentration). The authors acknowledge that the perceived measures used refer to perceived changes over a non-specific time period, and that a measure of perceived functioning level at specific points in time may have been more appropriate. It is also recognised that the observed differences between perceived and objective improvements in measures of mood and memory may reflect limitations in the tests used to measure these factors. The value of improvements in perceived measures is also acknowledged.

17. Emery, C.G. & Gatz, C.F. (1990) "Psychological and Cognitive Effects of an Exercise Program for Community-Residing Older Adults", The Gerontologist, Vol. 30, No. 2, pp. 184-188.

Impact: personal well-being, mood, development of life skills
Population: aged
Methodology: multivariate quantitative
Country: USA

Authors' abstract

This study examined the effects of a 12-week aerobic exercise program on psychological well-being and cognitive functioning in a group of ethnically diverse older adults living in an urban community. Forty-eight older men and women (mean age = 72 ± 6) were randomly assigned to one of three groups; an aerobic exercise training group, a social activity control group, or a waiting list group. Results indicated little change in psychological well-being and provided limited support for the association of physiological improvement with enhanced mastery and cognitive functioning.

Additional comments

The sample in this study consisted of 48 sedentary volunteers ranging in age from 61-86 years (mean age = 72 years) who were residents in a metropolitan inner city community. Forty women and eight men were initially included, however, only 39 subjects completed the 12 week program.

Participants were randomly assigned to either a physical exercise ($n = 14$), social activity ($n = 11$) or waiting list control group ($n = 14$). Those in the exercise group participated in one hour exercise sessions on three days a week for a period of 12 weeks. The program was developed specifically for older adults and for use in community settings and included rapid walking and muscle strengthening exercises. Participants were instructed to alter their exercise output to maintain their heart rate at 70% of the age adjusted maximum. Subjects in the social activity control group participated in 3 one hour sessions per week of non-physical activities such as card games, art projects and political discussions. Those in the waiting list control group did not participate in any organised activities. After the 12 week program was completed all participants were invited to participate in a further 12 weeks of the exercise program.

A number of assessments were conducted for all participants prior to and after the 12 week program and again after the additional 12 weeks. Physiological functions were measured to provide an indicator of fitness levels while several scales were used to measure psychological well-being and cognitive functioning. The Centre for Epidemiological Studies Depression Scale (CES-D), a one item self rating of anxiety (also from the CES) and a one item self rating of avowed happiness were used as measures of psychological mood. Locus of control (personal mastery) was assessed with the Rotter Internal-External Scale, the Pearlin Mastery Scale and the Lau and Ware Health Locus of Control Scale. Common indicators of fluid intelligence were used to assess levels of cognitive functioning. These were the Digit Span and Digit Symbol subtests of the Wechsler Adult Intelligence Scale - Revised (WAIS-R) and two tests of writing speed (digits and words) from the first NIMH longitudinal study of normal aging. These test were designed to measure participant's problem solving skills and ability to absorb new information. A 2 X 2 repeated measures ANOVA examined the data obtained. The relationship between changes in the physiological variables and the psychological and cognitive measures were explored with correlational analyses.

Overall, results indicate that the exercise program did not significantly impact on psychological well-being, physiological function or cognitive abilities for this sample of older adults. Correlational analyses provided only limited support for the relationship between improved fitness and changes in cognitive functioning and locus of control. No significant relationships were obtained for depression and anxiety. It should be noted that attendance for the social activity group was poor and so the two control groups were combined for analyses. It is suggested that a higher intensity exercise program may be required to facilitate changes in this predominantly female sample of older adults and that the measures used may not have been sensitive to the benefits obtained.

18. Gitlin, L., Powell Lawton, M., Windsor-Landsberg, L., Kleban, M., Sands, L. & Posner, J. (1992) "In Search of Psychological Benefits : Exercise in Healthy Older Adults", Journal of Aging and Health, Vol. 4, No. 2, pp. 174-192.

Impact: personal well-being, mood, development of life skills
Population: aged
Methodology: multivariate quantitative
Country: USA

Authors' abstract

This study assessed the short-term psychological effects of an exercise training program for 267 healthy elderly volunteers randomly assigned to either a bicycle group that trained three times a week for 4 months or an attention control group that met once a week during the 4-month period. A second aim was to identify predictors of favourable change in either physiological performance in stress-test parameters or in behavioural attributes at the conclusion of training. Psychological assessment procedures included indicators of basic mental health, perceived quality of life, and activity level. One-way repeated measure multivariate analysis of variance tests revealed only one significant univariate interaction effect: the exercising group showed significantly greater improvement in an index tapping report of feeling better from pretest to post-test as compared to controls. The directions of change for all other measures were uniformly in favour of exercisers but did not approach statistical significance. Behavioural and psychological variables were also found to be irrelevant in predicting improvement in physiological performance at Time 2. These data suggest that exercise program effects on psychological and behavioural indicators were very modest for older adults with very high levels of functioning.

Additional comments

A sample of 267 community residents between the ages of 60 and 89 years (mean age = 69 years) were recruited through senior centres and public announcements to participate in this study. Subjects were recruited from the Philadelphia area over a period of 4 years. A multistage screening protocol using strict medical criteria was employed such that the subject population was defined as having "better than average health".

Subjects were randomly assigned to either the exercise group or the attention control group. It is assumed that approximately half of the sample was assigned to each group, however precise details on the size of each group are not presented. Those in the exercise group trained on a bicycle ergometer three times a week (for about 2 hours per week) for a 4 month period. The attention control group involved participation in discussion seminars on different aspects of "positive life-style" and these subjects met once a week for about 2 hours for the 4 month treatment period. For both exercise and control groups, subjects met in small groups of between 4 and 6 participants at a senior centre within their vicinity.

Data from both groups was collected on a number of physiological, psychological and behavioural measures from an initial testing session held in the exercise laboratory at the Philadelphia Geriatric Centre (pre-test) and again following completion of the 4 month training period (post-test). Psychological well-being was measured with the Affect Balance Scale (both Positive Affect and Negative Affect subscales), the Centre for Epidemiological Studies Depression Scale (CES-D), the State Anxiety Index and a 4 item index created to measure body image. Perceived quality of life was also assessed with a number of scales. The Subjective Time Use measure was employed to assess one's satisfaction with their overall

leisure pursuits, while the Self-Rated Health sub-index of the Philadelphia Geriatric Center Multi-level Assessment Instrument (MAI) measured perceived health. A specially developed Perceived Change for the Better scale measured changes in subject's assessments of quality of life. Physical Mastery and Perceived Energy scales were developed to measure perceived mastery/benefits of physical activities and perceived energy/ability to function in daily life. An additional MAI index which summed frequency ratings for participation in a number of social activities was used to measure Objective Time Use and the Self-Motivation Scale and a number of physiological measurements were also completed. A two-way repeated measures MANOVA was used to examine the relationships between variables.

The results of this study indicated that the effects of exercise on psychological and behavioural measures in this healthy sample of older adults were very modest. The Perceived Change for the Better index was the only indicator which showed statistically significant differences between the exercise group and the control group. The specific items in this index were further investigated and it was demonstrated that improvements in subjects' perceptions of their energy levels, exercise habits, sense of achievement, strength and balance were significantly greater for the exercise group than for the control group. Although there appeared to be few differences between the control and experimental groups following the treatment period, improvement over baseline levels was observed for both groups. It is therefore suggested that participation in a meaningful program may result in self-reports of "feeling better" regardless of whether this program involves exercise or not. It is also noted that due to the strict screening process employed in the study, participants were healthier than average and demonstrated higher than average levels of initial psychological well-being. This may have limited the effects of the exercise program on subsequent levels of psychological well-being.

19. Gleser, J.M., Margulies, J.Y., Shlomo Porat, M.N., Mendelberg, H. & Wertman, E. (1992) "Physical and Psychosocial Benefits of Modified Judo Practice for Blind, Mentally Retarded Children: A Pilot Study", Perceptual and Motor Skills, Vol. 74, pp. 915-925.

Impact: personal well-being, development of life skills
Population: children with physical and mental disabilities
Methodology: multivariate quantitative
Country: other (Israel)

Authors' abstract

A modified form of judo training was practised by a class of 7 blind, mentally retarded children with associated neuropsychiatric disturbances. The biweekly training program lasted for 6 months. Analysis indicated improvements in physical fitness, motor skills, and psychosocial attitude. The authors concluded that a modified form of judo can be used as a therapeutic, educational, and recreational tool for multiply handicapped children.

Additional comments

Seven multiply handicapped children who were residents of the Jewish Institute for the Blind participated in this study. This sample included 5 boys and 2 girls aged between 6 and 12 years old.

The intervention involved participation in 90 minute Judo classes, twice a week for 6 months. Data was obtained from a series of examinations which were performed before the training began, immediately after the 6 month training program was completed and five months later. Measures included orthopaedic/neurological assessments, physical fitness, developmental skill levels and psychosocial functioning. The Brigance Diagnostic Inventory of Early Development was used to measure developmental skills including motor skills and self-help skills. A scale designed by the staff was used to assess overall psychosocial functioning from a rating of 1 (a very negative change) to 5 (a very positive change). Data was analysed using the Wilcoxon matched-pairs signed-ranks test.

The results of this study indicate that significant improvements in psychosocial functioning, physical fitness and most of the fine and gross motor skills were obtained with participation in the judo program. Few changes were evident for the orthopaedic/neurological examinations or self-help skills. The observed benefits did not persist to the five month follow up measure although scores did not regress to baseline levels. The limitations of this study including the small sample size and lack of control or comparative groups are acknowledged. It is recognised that a causal relationship between participation in the judo program and the observed improvements can not be concluded.

20. Gleser, J. & Mendelberg, H. (1990) 'Exercise and Sport in Mental Health: A Review of the Literature', Israel Journal of Psychiatry and Related Sciences, Vol. 27, No. 2, pp. 99-112.

Impact: mood, self-esteem
Population: general population, clinical population
Methodology: literature review
Country: USA

Authors' abstract

A literature survey was conducted of the most prominent psychological effects and therapeutic applications of physical activity in mental health. This paper primarily reviews the literature comparing therapeutic exercise and sport with more traditional therapies and activities. Commentary on research methods is also presented.

Additional comments

This paper looks at literature (dating mainly from the 1980s) dealing with the psychological effects of exercise on anxiety reduction, mood elevation and self-esteem, and in the case of anxiety reduction and mood elevation compares these effects to those achieved using alternative treatment methods or control groups.

Several of the studies reviewed show links between physical activity participation and reduced anxiety or tension levels. However most of the articles reviewed indicated that significant benefits are dependent on the exercise being of a sufficient high intensity. It was found that the potential benefits that could be obtained were similar to those that might be expected for more traditional methods of reducing tension such as rest in a sound filtered room. This supports the hypothesis that diversion might be a crucial ingredient in the reduction of state anxiety.

Considerable evidence suggests that physical exercise is also associated with improved mood, however, most studies refer to non-clinical subjects when describing the antidepressant effects of exercise with very few studying clinical patients. Both anecdotal and research evidence supports the theory that self-esteem is enhanced by physical activity.

The authors have identified several methodological problems in the study of psychological and therapeutic effects of physical activity including: placebo effects (biological measures modified by changing patient expectations); lack of standardised diagnostic criteria to define subjects (volunteers used; descriptive terms used imprecisely); and the use of assessment tools that are not adequate for the task. Despite their methodological limitations, research studies point to physical activity as an effective treatment for certain psychological conditions.

21. Griffiths, A. (1996) "The Benefits of Employee Exercise Programmes: A Review", Work and Stress, Vol. 10, No. 1, pp. 5-23.

Impact: personal well-being, mood, social cohesion
Population: working population
Methodology: literature review, program evaluation
Country: UK, USA

Author's abstract

This paper considers the rationale behind the introduction of workplace exercise programmes, and provides a brief review of their benefits. Many efforts towards their evaluation have been inadequate, largely because of a lack of methodological rigour and failure to consider such programmes in their wider organisational context. The evidence to date largely supports the view that for individuals, employee exercise programmes may confer significant benefits - more so for their physical health than for psychological well-being. The evidence for benefits to organisations remains promising but largely inconclusive.

Additional comments

The author-reviews a number of recent and past studies in an effort to evaluate the effectiveness of employee exercise programs (EEPs), particularly focusing on the benefits of such programs to the individuals and to the organisation.

The evidence of benefits of such programs, though positive, remain largely inconclusive. Many evaluations have been inadequate due to methodological problems such as the self-selection of participants and lack of control groups. In addition there is a general lack of literature focussing specifically on workplace exercise programs with much of the literature focusing on general health promotion programs, however, the author states these such studies should provide direction in the development of effective worksite programs, while much of the research reviewed identifies mainly physical benefits, several studies supports the hypothesis that physical activity, as distinct from physical fitness, has a positive effect on psychological health and mood. Moderate exercise has generally been found to provide the greatest benefits. In addition a number of articles are discussed which indicate that workplace exercise programs may be of benefit in improving staff morale and cohesiveness. The author concludes that the aim of worksite programs should be to increase participation rather than fitness.

There are several risks of introducing EEP's mentioned in the article including the need for screening and monitoring individuals with existing health conditions, and the risk of exercise becoming compulsive for some individuals which can be associated with psychological problems.

22. Hill, R.D., Storandt, M. and Malley, M. (1993) "The Impact of Long-Term Exercise Training on Psychological Function in Older Adults", Journal of Gerontology, Vol. 48, No. 1, pp. 12-17.

Impact: mood, development of life skills
Population: aged
Methodology: multivariate quantitative
Country: USA

Authors' abstract

The effect of long-term aerobic training on psychological function was examined in 87 sedentary older adults who engaged in a year-long endurance exercise training program compared with a non-exercising control group. In addition to improved cardiovascular fitness, a positive change in self-reported morale was found for the exercise condition. Of the cognitive functions measured, a significant effect was noted for the Wechsler Memory Scale (WMS) Logical Memory sub-test; however, this effect was caused by a decline in performance from pre- to post-testing in the control group. Long-term exercise training had little, if any, effect on improving cognitive function in this older adult sample.

Additional comments

Participants in this study were older adults who responded to advertisements for an exercise program to improve cardiovascular health. The subjects included were healthy non-smokers who were active but had not engaged in exercise training for at least 2 years. A total of 121 subjects (50.4% female) ranging in age from 60 to 73 years (mean age = 64.0 years) completed the treatment intervention and all of the required measures.

A number of physiological measures were used to assess the fitness effects of the exercise training program. Three psychological measures assessed the effects on cognitive function. The Wechsler Memory Scale logical memory sub-test measures immediate recall and was used as an indicator of short term memory. The Digit Symbol sub-test of the Wechsler Adult Intelligence Scale - Revised (WAIS-R) was used to measure working memory and attention while perceptual orientation and psychomotor speed were assessed with the Crossing Off Task. The Philadelphia Geriatric Center Morale Scale was also administered as a self reported measure of general well-being and positive outlook.

All subjects completed the psychological and physiological measures and were then assigned to either the exercise (n = 87) or the non-exercising control group (n = 34). Those in the exercise group attended 50 minute training sessions on 3-5 days a week. The program involved 2 months of flexibility training followed by progressive aerobic exercise (walking or running) with participation in groups of 5-7 subjects. Although the exercise program was originally planned to continue for a 12 month period, participants were given the option to exit the program if their fitness levels reached a plateau after 9 months. The psychological and physiological measures were assessed for a second time upon completion of the program (for the exercise group) or after 12 months. Multivariate Analysis of Variance procedures were used to examine the effects of the exercise program on cognitive functioning.

Results indicate that exercise did not lead to improvements in measures of cognitive function. Although a significant between groups effect was obtained for the 3 cognitive measures, this was due to a decrease from pre- to post-test measures of the WMS Logical Memory sub-test in the control group. This may suggest that exercise counteracts the normal decline in

memory function with age, however, this trend was not supported by the other aspects of memory tested. Those in the exercise condition showed significantly greater improvements in self-reported morale than those in the control group suggesting that while exercise may not improve cognitive functioning in older adults it may have benefits for psychological well-being. It should be noted that a number of specific medical criteria were used to select the sample from the total number who responded to the advertisements such that the sample was likely to be healthier than average. Results, therefore, are not necessarily generalisable to the general population of older adults.

23. Hudgson, N.M. (1991) "Perceived Psychological Benefits of Leisure Participation: A Study of Black Residents of Durban's Berea", S.A. Journal for Research in Sport, Physical Education and Recreation, Vol. 14, No. 1, pp. 33-43.

Impact: personal well-being, self-esteem
Population: indigenous workers
Methodology: qualitative
Country: other (South Africa)

Author's abstract

Perception of the benefits of leisure participation was examined. The subjects were 150 domestic workers, cleaners and gardeners, who live and work on the Berea. Personal interviews were conducted in Zulu. The results and questionnaire responses indicated that the six most important benefits irrespective of gender or age were: passing time, avoiding routine, feeling refreshed physically and mentally, experiencing excitement, developing confidence and meeting new people. The leisure clusters cultural intellectual, do-it-yourself domestic and entertainment mass media were felt to be very important for all ages and both genders.

Additional comments

The participants in this study were 150 black residents of Berea, South Africa, who worked in service oriented occupations (e.g. domestic work, gardening). A random selection from within each subdivision of the Berea North area was used to ensure that there was representation from throughout the area. Participants were approached personally at their place of employment.

The questionnaire was constructed by the author and consisted of 18 statements which investigated the benefits of leisure participation. Subjects were asked to indicate how true these statements were (on a scale from 1= never true to 5 = always true) for each of the eight leisure clusters of Nature/Garden, Outdoor Strive, Cultural/Intellectual, Sea/Coast Based, Entertainment/Mass media, Sports, Hobbies, and Do it yourself/Domestic. Examples of activities were provided for each cluster. All interviews were conducted verbally (in Zulu) and questionnaires were completed by the interviewers on behalf of the subjects. Weighted means for the psychological benefits and leisure clusters were compared for the total group as well as for different age groups (15-34, 35-54 and 55+) and gender.

Results indicated that the six most commonly reported benefits were: passing time, avoiding routine, feeling refreshed physically and/or mentally, experiencing excitement, developing confidence and meeting new people. There was some variation in rankings with gender and age group, but considerable agreement in the most important benefits. It was also found that Culture/Intellectual, Do-It-Yourself/Domestic and Entertainment/Mass Media were the three leisure clusters perceived to have the most benefits. Considerable differences were evident for gender and age in these rankings. Interestingly, sport was perceived to yield the least benefits and was ranked last by all age groups and females, and second to last by males. It is suggested that this sample may have had limited opportunities to participate in a number of the leisure activities included in this study and that this may have influenced their perceptions of the benefits they may provide. The fact that this sample was targeted towards a very specific population should be considered when evaluating these results. In addition, it should also be noted that this study is purely descriptive in nature and identifies perceptions of benefits rather than attempting to measure actual benefits.

24. Hudgson, N.M., Andrews, B.C. & Butler-Adam, J.F. (1995) "Leisure Participation and Perceptions of Psychological Benefits", S.A. Journal for Research in Sport, Physical Education and Recreation, Vol. 18, No. 2, pp. 29-37.

Impact: personal well-being, self-esteem
Population: adults
Methodology: qualitative
Country: other (South Africa)

Authors' abstract

Perceptions of the psychological benefits of leisure participation were investigated. The sample consisted of 300 residents of a non-central, high density area of Durban. Questionnaires were distributed on a random selection basis. SPSSX was used for statistical analysis of the data. Sports appeared to be the leisure activity from which the most benefits were perceived to be derived, followed by outdoor active and sea/coast based activities. The benefits which were most often derived from leisure participation were passing time, changing daily routine, and feeling refreshed physically and/or mentally. Being intellectually stimulated was not considered a psychological benefit of participation in sports, outdoor active and sea/coast based activities.

Additional comments

The sampling procedure used in this study aimed to provide a representative sample of people aged over 15 years, living in a non-central, yet high density city area in South Africa. One thousand questionnaires were randomly distributed on a proportional basis, throughout Berea North, Durban. The sample used in this study consists of the 300 questionnaires that were returned.

The questionnaire employed in this study consisted of 2 sections. Section A addressed the socioeconomic variables of gender, age, occupation and type of residence. Section B consisted of 18 statements covering possible benefits which might accrue through participation in leisure activities. For example, "doing activities with companions", "improving physical condition" and "developing a sense of accomplishment". Subjects were asked to rate the accuracy of these statements from 1 (never true) to 5 (always true) in relation to sports, outdoor active and sea/coast based activities of which they were given a list of examples. Frequency tables were used to analyse the data obtained.

Results indicate that subjects perceived sports participation to have the most benefits, followed by outdoor active and sea/coast based activities. The most commonly reported benefits of sports participation were "improving physical condition", "passing time", "meeting new people", "feeling physically and/or mentally refreshed", and "developing a sense of accomplishment". None of the socioeconomic variables of gender, type of residence or occupation were found to have a significant influence on perceptions of the benefits of leisure activities. However, perceived benefits were found to differ with age. Younger people tended to respond more positively while older people were more likely to report that benefits 'sometimes' accrue.

Factors to consider when evaluating the findings of this study include the low response rate, which could suggest that the responses received may not be representative of the general population. It should also be noted that this study is purely descriptive in nature and identifies perceptions of benefits rather than attempting to measure actual benefits.

25. Hultsman, W. (1996) "Benefits of and Deterrents to Recreation Participation: Perspectives of Early Adolescents", Journal of Applied Recreation Research, Vol. 21, No. 3, pp. 213-241.

Impact: personal well-being, self-esteem
Population: adolescents
Methodology: qualitative
Country: USA

Author's abstract

This study had two purposes: to determine, via the open-ended questionnaire, the perceived benefits of and deterrents to recreation participation; and to obtain specific recommendations from early adolescents for those who develop and provide recreation opportunities for this age cohort. Content analysis procedures were used to interpret responses. Four categories of benefits surfaced from this study (searching for identity, relating to others, filling time, and improving talents). Deterrents included the creation of time-related problems, dissatisfaction with specific aspects of recreation activities, and uncomfortable situations created by others who participated. Early adolescents want to send programmers and providers the message to "include us or lose us. Think like us, don't assume or impose."

Additional comments

The 384 participants included in this study were a random sample of students in grades 6 to 9 from 23 schools in the south-west of the United States. Fifty-eight percent of the participants were female.

The questionnaire consisted of open-ended questions chosen from the integration of previous research to investigate key issues regarding benefits of and deterrents to participation in recreation. For example, "Besides having fun, what have you gained from participation in recreation activities?", "What are some of the things you don't like about recreation activities?" and "What advice do you have for those who plan recreation programs for pre-teens and teens like yourself?". The questions were part of a larger study that examined many aspects of early adolescent life. Data analysis involved content analysis procedures which consisted of responses being assigned to different categories based on key-words and phrases.

Responses identified four broad categories of benefit: searching for identity/self confidence, relating to others, filling time and improving talents. Of these, "improving talents" and "relating to others" were found to be the most commonly reported benefits. Six categories of deterrents were also identified: behaviour of other participants, poor quality of leadership/organisation, impact of rules and regulations, time conflicts, safety, and aspects of the activity itself i.e. too demanding, strenuous and/or boring. The most popular categories were "aspects of the activity itself", "time conflicts" and "behaviour of other participants". However, almost 20% of the sample did not identify any deterrents.

The author notes that female respondents provided more descriptive answers than their male counterparts. This may have influenced the results such that they are more representative of female adolescents than males. The qualitative nature of this study should also be considered when evaluating these results.

26. The Inter-Provincial Sport and Recreation Council, The Fitness Directorate of Health Canada and the Canadian Parks/Recreation Association (1994) Canadian Youth: Does Activity Reduce Risk? An Analysis of the Impact and Benefits of Physical Activity/Recreation on Canadian Youth-At-Risk. [online] Available www.lin.ca/resource/html/document.htm [November 2000].

Impact: crime prevention, self-esteem, community pride/identify, development of life skills
Population: youth-at-risk
Methodology: literature review, qualitative
Country: Canada

Author's abstract not provided

Additional comments

This study consisted of three methodologies and included a review of the literature, focus group sessions and a survey to explore current initiatives in Canada.

The 64 focus group meetings involved 465 participants and aimed to gather information about issues related to youth-at-risk and physical activity programmes. Meetings were held in fourteen locations across the country including both rural and urban areas. At each location, four separate meetings were held to target separate groups. The specific groups targeted were administrators/policy makers, front-line workers, youth between the ages of 14-18 and parents. A further 8 meetings targeted Native specific populations. Information on existing programs was collected from a nationally distributed mail-out survey (e.g. ISRC representatives, affiliated members of the CPRA). From a total of 315 surveys originally distributed, 96 responses were received (32 directly and an additional 64 through the a pyramid process). The literature review was intended to collect relevant academic and professional literature and included a search of the Sport Discus and Medline databases.

The focus group sessions lasted for approximately 2 hours and involved discussion of a number of issues relating to youth-at-risk and physical activity programmes. Sessions included identification and exploration of various physical activity/recreation program initiatives for youth-at-risk, identification of variables that determine success in a program and issues relating to program delivery. The actual questions varied slightly for each of the specific target groups and are included in the appendices. The mail-out survey consisted of a letter requesting specific information on physical activity/recreation programs or initiatives designed to address the needs of youth-at-risk.

The positive influence of participation in physical activity/recreation on the reduction of risk-factors for youth was identified in the literature review. The benefits identified related to a number of issues including psychological health, physical health, familial interaction, peer influence, academic performance, community development and other lifestyle behaviours. Results from the focus group sessions were found to be relatively consistent between all groups and identified the potential for physical activity and recreation initiatives to positively impact on youth-at-risk. There was a general consensus that physical activity/recreation can influence many issues for youth-at-risk including improving self-esteem, providing a sense of belonging, teaching teamwork and social skills, providing positive role models and teaching cognitive, leadership and life skills. A number of issues relating to program delivery were discussed including the need for youth to be more involved in the development of

programmes. Recommendations for future research and reform of current initiatives was also suggested. Results of the survey on current initiatives provided information about the nature of existing programs in Canada including some information on factors related to program success.

27. Iso-Ahola, S.E. & Park, C.J. (1996) "Leisure-Related Social Support and Self-Determination as Buffers of Stress-Illness Relationship", Journal of Leisure Research, Vol. 28, No. 3, pp. 169-187.

Impact: personal well-being, mood, social cohesion
Population: sports participants
Methodology: multivariate quantitative
Country: USA

Authors' abstract

The purpose of this study was to test the hypothesis that leisure-generated social support (companionship and friendship) and the self-determination disposition (perceived freedom and intrinsic motivation) buffer the adverse effects of life stress on mental and physical health problems. Data were provided by 252 subjects who were 18 to 65 years old and practitioners of Taekwondo sport as a leisure activity. Results indicated that life stress was positively related to mental and physical illness symptoms and negatively related to perceived health, regardless of any moderating variables. Hierarchical multiple regression analyses, however, showed that leisure companionship moderated the effect of life stress on mental illness (depression) symptoms, whereas leisure friendship did the same for physical illness symptoms. Data provided no support for the positive moderating effect of the self-determination disposition. In general, results confirm the importance of social support derived from leisure activity participation and suggest that it is the activity and things done with friends/companions that buffer the adverse effects of stress on physical and mental health.

Additional comments

The participants included in this study were 252 Taekwondo practitioners (mean age = 32 years) who attended one of 10 randomly selected private taekwondo studios in the Washington D.C. metropolitan area and practised taekwondo during their leisure time.

The questionnaire used in this study measured a number of dependent variables related to physical health and mental health. Mental health was measured by the Center for Epidemiological Studies Depression Scale (CES-D) while perceived health was measured by a four item scale developed by the authors. The independent variable for this study was life stress as measured by the Social Readjustment Rating Scale (Holmes & Rahe's, 1967). Also investigated were the moderating effects of leisure-related variables on the relationship between stress and physical/mental health. The first set of moderator variables ('leisure-generated self-determination dispositions') referred to the influence of intrinsic leisure motivation and perceived freedom. Intrinsic leisure motivation was measured by the modified Intrinsic Leisure Motivation Scale (ILMS) while perceived freedom was assessed using the modified Perceived Leisure Freedom Index (PLFI). The second set of moderator variables investigated were 'social support indicators' (leisure friendship and leisure companionship). Leisure friendship was measured by 15 items adapted from the Social Support Appraisals Scale (SS-A) while leisure companionship was measured using the Leisure Companionship Index. Control variables relating to level of involvement (in Taekwondo) and sociodemographic variables (age, gender, education, family income, living arrangement, ethnic origin, and occupation) were also collected. Correlational and hierarchical multiple regression analyses were used to investigate the relationships between variables.

The results of this study indicate that leisure friendship, leisure companionship, intrinsic leisure motivation and perceived leisure freedom were all significantly negatively correlated with depression, regardless of life stress. However it was also shown that the level of these variables varied considerably amongst the participants. As such, it is demonstrated that sports participation may have a buffering effect on the impact of stress on mental health but only in those cases where participants were deriving a relatively high level of friendship and companionship from participating. In the case of those participants who were experiencing relatively low friendship and companionship rewards from the class, the buffering effect on depression was significantly less as stress levels increased. The impact of intrinsic leisure motivation and perceived leisure freedom on the relationship between stress and mental health was non-significant.

28. Kleine, D. (1994) 'Sports Activity as a Means of Reducing School Stress', International Journal of Sport Psychology, Vol. 22, pp. 366-380.

Impact: mood
Population: adolescents
Methodology: multivariate quantitative
Country: other (Germany)

Author's abstract

Sixty-one male and female 9th graders participated in a study which aimed at investigating effects of exercise on mood states after a typical stress situation in school. Mood state was first induced by a math exam. Students were then randomly assigned either to one of two physical education (P.E.) classes (practising a circuit training), or to a literature class. Mood state was measured using the "Eigenzustands-Skala" (Nitsch, 1976) (1) before and (2) after the math exam and (3) after the treatment. In the P.E. groups, heart rate was taken as an indicator for fitness. Results showed that deficiency, efficiency, and activation were negatively affected by the math exam. After adjusting for the pre-treatment mood, exercisers showed significantly better mood states than non-exercisers in terms of activation, efficiency, and tension, with no concomitant increase in deficiency/fatigue. Exercising boys reported more positive efficiency and tension states than exercising girls. Additional analyses revealed that mood benefits were restricted to aerobically fit students, whereas unfit exercisers did not differ significantly in mood from the controls. Though physical exercise led to clear mood benefits, differential effects occurred. Mood benefits from exercise seemed to be obtainable only for aerobically fitter subjects. However, this finding may be specific to the exercise mode under study.

Additional comments

The sample in this study consisted of 70 students (mean = 15 years of age) from 3 ninth grade classes at a German high school. Sixty one participants completed the required measures.

Mood was measured using the 'Eigenzustands-Skala', a 40 item instrument which asks subjects to rate how they feel at the present moment. Questions were asked in relation to 4 broad categories of mood: Tension, Activation (energy, initiative), Deficiency (fatigue) and Efficiency (abilities adequate for demands).

All participants completed the mood scale before being administered a 40 minute mathematics test. Mood states were measured for a second time upon completion of the test. Subjects were then randomly allocated to either a German literature class (9 males and 10 females) or a physical education class (male and female physical education classes were conducted separately with 23 in the female class and 19 in the male class). The physical education class involved a brief warm-up followed by circuit training and included heart rate monitoring to provide a measure of fitness. At the completion of each class, subjects in both the literature (control) and physical educational classes again completed the mood scale questionnaire. Data was examined with Multivariate Analysis of Covariance using the post-maths exam measures of mood (pre-treatment measures) as the covariates and the post-treatment measures of mood as the dependent variable.

It was found that participation in physical education had greater mood enhancing effects following the maths test than the control German literature class. The exercise groups demonstrated greater improvements on the mood subscales of Activation, Efficiency and

Tension than the control group. No statistically significant differences between the groups were observed for the Deficiency (fatigue) measure. In contrast to expectations, the male and female physical education classes differed in terms of the mood benefits reported with significant differences on the Efficiency and Tension subscales and females rating significantly less improvement in each. There were no statistically significant differences between males and females in the Activation and Deficiency subscales. In both males and females, aerobically fitter subjects seemed to derive greater mood benefits from the physical education class than non-fit subjects. While physical education classes may be a promising method for reducing the effects of stressful school experiences for early adolescents, it seems that there may be individual differences in the effects. As mood benefits were found to differ with fitness levels and gender, the authors suggest that differences such as motivational preferences for particular activities and the type of exercise may influence the stress-buffering effects of exercise. It should also be noted that the observed results were measured after a single session of exercise; the long term benefits of physical activity on stress have not been established.

29. Lankford, S., Szabo, C., Lagaree, I. & Neal, L.L. (2000) "Arctic Winter Games: A Study of Benefits of Participation" Journal of the International Council for Health, Physical Education, Recreation, Sport and Dance, Vol. 36, No. 4 (Summer), pp. 51-54.

Impact:	self-esteem, personal well-being, social cohesion, development of life skills, community pride/identity
Population:	participants
Methodology:	qualitative
Country:	Canada

Authors' abstract

Now in its third decade of successful operation, the Arctic Winter Games (AWG) constitute culmination of sport, culture, national/regional identity, individual and collective growth, and benefits of sport and cultural performances. These biennial events, involving a number of countries, have many benefits. This article reported findings of the first attempt to address systematically and confirm social benefits of these games. Findings can serve as baseline data for forthcoming events with research emphasising personal input; documenting personal, social, and community benefits; validating stated purposes; segmenting gender values; observing the subtle balance between friendly competition and shared cultural values; and capping them with a celebration of winter. Findings from 548 surveys (M=59.2%, F+40.8%) indicated peers and coaches influenced participants the most to take part. Data were analyzed using factor analyses of social benefits via varimax rotation to derive the factors reported - positive personal experiences, socialisation and cultural awareness, enhanced self-esteem and growth in personal outlook, providing healthy opportunities for youth, and a sense of belonging and strengthening community ties. These factor loadings confirmed original goals established by the AWG committee and previous sport councils in Canada.

Additional comments

The sample included in this study consisted of 548 athletes, coaches and volunteers (324 males, 224 females) who were involved with the 1998 Arctic Winter Games (AWG), a biennial sporting carnival held in North West Canada, incorporating both mainstream sports and traditional arctic games. The majority of the sample (approximately 80%) were athletes who were either registered for the regional or territorial trials (competitions leading up to the AWG) or who were participants in the actual AWG.

The questionnaire used in the study was developed by the researchers and representatives from the government of the Northwest Territories. Included in the survey were questions relating to athletic competition, cultural and social interchanges, spirit of fair play and training. The questionnaire also addressed issues associated with personal and community identity. In addition, several case studies, interviews and focus group sessions were used to assist in the understanding of the impact of the games. Responses were mainly qualitative in nature and focussed on the perceived benefits of participating in the AWG. Data obtained from the questionnaire was analysed using factor analysis (principal components) with varimax rotation.

Analysis of the survey results identified 5 broad groups of benefits associated with participation in the Games: positive personal experiences and benefits, socialisation and cultural awareness, enhanced self esteem and growth in personal outlook, providing healthy opportunities for youth and sense of belonging and community ties. The event-specific nature of this study should be noted when assessing the results. Many of the reported benefits may

be particular to the AWG and therefore may not necessarily be associated with sports participation more generally (particularly in relation to the community and cultural benefits identified).

30. Leith, L.M. & Taylor, A.H. (1990) "Psychological Aspects of Exercise" A Decade Literature Review", Journal of Sport Behaviour, Vol. 13, No. 4, pp. 219-239.

Impact: personal well-being, mood, self-esteem
Population: general population, adults, college students, aged, women, clinical population, children
Methodology: literature review
Country: Canada, USA

Authors' abstract

The purpose of this paper is to analyse the potential of chronic exercise in promoting psychological and emotional well-being. Numerous review articles clearly support the position that chronic exercise involvement has beneficial psychological effects. While these articles are undoubtedly thorough and informative, they do not provide us with the objective evidence necessary to support their claims. For this reason, the present paper focuses on empirical research investigating the relationship between psychological and emotional well-being and chronic exercise. A computer search spanning the past decade revealed 81 data-based studies directly related to psychological aspects of exercise involvement. Each of these studies is critically reviewed in terms of research design, psychological focus of the study, subject description, use of controls, the psychological assessment instruments, documented fitness changes (as measured by VO₂- Max, cycle ergometry, aerobic points, etc.), and the outcome of the study. The paper concludes by summarising the status of research in this important area.

Additional comments

This paper reviews 81 empirical studies, published between 1980 and 1990, which investigate the relationship between habitual exercise and psychological well-being in a range of populations. Each of the studies is classified into one of three design categories: pre-experimental (9); quasi-experimental (46); and experimental (26). Within each design category the research studies have been summarised in terms of participant description, psychological focus, use of control groups, psychological assessment instrument employed, fitness changes and the outcome of the study. A wide variety of psychological factors are investigated including depression, anxiety, self concept and 'personality' are discussed.

Overall, seventy percent report significant improvement on the psychological construct under investigation (pre=79%; quasi=80%; exp=50%). When partial improvement is included eighty percent reported psychological benefits of exercise (pre=89%; quasi=87%; exp=69%). These results indicate less support for the psychological benefits of exercise in the experimental category than in the other two categories. This suggests that as research becomes more 'scientific' the beneficial effects are less apparent.

Some methodological concerns that the authors have considered when reviewing these studies was the limited use of control groups in pre- and quasi-experimental groups; the diverse selection of subjects; and the lack of establishment of fitness change in subjects (only 54% documented fitness gains). Additionally, many studies failed to report the frequency, intensity, duration and nature of the physical activity used, making it difficult to determine whether different characteristics of the exercise experience, particularly whether the activity leads to improvements in fitness, result in different psychological outcomes. The need for follow-up or longitudinal studies to determine the long term benefits of exercise is also recommended for future research.

31. Long, J. and Sanderson, I. (1998) "The Social Benefits of Sport: Where's the Proof?" Conference Proceedings: Sport in the City: A Major International Conference, Sheffield, 2nd - 4th July, 1998, Loughborough University, Sheffield Hallam University and The University of Sheffield, Vol. 2

Impact: social cohesion, crime prevention, self-esteem, development of life skills
Population: residents of deprived inner city areas
Methodology: qualitative
Country: UK

Authors' abstract not provided

Additional comments

This report examines the reported community-based benefits of sport, by reviewing a number of government policy papers, and via the collection of qualitative survey. A postal survey was sent to Directors of Leisure Services to elicit their views on the potential role of sports development programs and activities in inner city areas. The views of Sports Development Officers and Leisure Centre Managers were also obtained. No indication is given of the total number of interviews conducted, but it is not expected to be large.

The bulk of respondents recognised the personal development benefits of sports, such as improvements to self-esteem. The role of sport in improving social cohesion and reducing youth crime was also widely recognised. However, there was less acknowledgment of the ability of sport to act as a source of broader community improvement via such things as the empowerment of disadvantaged groups and the development of resident's life skills. Some respondents insisted that their programs had produced real benefits, but because of the interrelatedness of peoples lives they could not be sure that it was their particular project that had produced the benefits they observed. Many respondents argued that it didn't matter if the project involved sport, arts, recreation, exercise or leisure, it was the process that counted and that this process should include involving individuals in the decision making and, preferably, a tangible product of interest to the individual at the end.

The qualitative nature of this report should be noted when considering the conclusions drawn. In addition, while it appears that the opinions offered by the bulk of respondents are based on personal experience it is possible that their responses may also reflect perceptions of the outcomes that *should* occur.

32. McAuley, E. (1994) "Physical Activity and Psycho-Social Outcomes" (pp. 551-568). In C. Bouchard, R. Shephard, & T. Stephens, Physical Activity, Fitness and Health, International Proceedings and Consensus Statement. Champaign, IL: Human Kinetics.

Impact: mood, self-esteem, personal well-being
Population: clinical population, general population
Methodology: literature review
Country: USA

Author's abstract not provided

Additional comments

This paper is a comprehensive review of articles published in the mid 1980s to early 1990s that look at the positive psychosocial benefits of physical activity, in particular perceptions of self-esteem, psychological well-being and self-efficacy.

Upon reviewing three major articles (that combined, review a total of 65 studies) which investigate relationship between physical activity and self-esteem, the author suggest that, while some evidence of positive association exists, the robustness of the relationship is questionable, due to methodological and conceptual flaws apparent in the majority of studies reviewed. This article also investigates the relationship between physical activity and psychological well-being. This analysis is limited to positive psychological affects of exercise, and consequently, the impact of exercise on negative conditions such as anxiety and depression is not considered. Of the twenty-three articles (total of 27 studies) reviewed the majority (69%) indicate a positive association. However, as in the case of self esteem, this conclusion is tempered by methodological limitations in many of the studies reviewed. In particular, most previous research in this area has focused on clinical populations and the author claims that many of the psychological measures used are unsuitable in analysis of the effect of exercise. Most of the interventions reporting increases in positive affect do so for moderate intensity exercise. A further review of sixteen articles found consistent and robust evidence that participation in physical activity positively influences perceptions of self-efficacy, in particular physical capability. This result was found with both longer term participation and acute bouts of exercise, and across gender and age.

Many of the conclusions drawn are based on diverse measures and methods and consequently, the author suggest that future research efforts must address the following issues: consistency in methodology, definitions and measurement; lack of longitudinal studies, randomised designs, and adequate follow-up; and use of inadequate measures.

33. McAuley, E. and Rudolph, D. (1995) "Physical Activity, Aging and Psychological Well-Being", Journal Aging and Physical Activity, Vol. 3, pp. 67-96.

Impact: mood, self-esteem, personal well-being
Population: older adults
Methodology: literature review
Country: USA

Authors' abstract

This review examines the effects of exercise and physical activity on the psychological well-being of older adults. Unlike most of the literature in this area, this review focuses primarily on those psychosocial outcomes that are generally positive in nature. As well as considering the overall effects of physical activity, the roles of program length, subject sex, age, physical fitness, and measurement are considered. Overall, the results of the 38 studies reviewed are overwhelmingly positive, with the majority reporting positive associations between physical activity and psychological well-being. This relationship appears to be moderated by the length of the exercise programs; longer programs consistently report more positive results. There is little evidence that exercise has differential psychological effects on men and women or differing ages. Whereas training protocols seem to result in significant changes in physical fitness and well-being, such improvements appear to be unrelated. The review concludes with a brief discussion of possible mechanisms underlying the physical activity/psychological health relationship, and several directions are recommended for future research.

Additional comments

This paper reviews 38 studies published in the ten years prior to 1995. The focus of this review is on exploring the association between exercise and physical activity and psychological well-being in older adults aged 45 years or more. For the purpose of this review the authors have conceptualised psychological well-being to include both positive affect as well as the absence of negative affect.

Of the thirty-eight studies reviewed, twenty-four used exercise programs, five used single acute bouts of exercise, and nine relied on subjects recall of physical activity participation. The studies involving exercise programs were primarily aerobic in nature. Twenty-eight of these studies reported some evidence of a relationship between levels of physical activity and enhanced psychological well-being, and the remaining ten reported no change or relationship. There is little empirical support for age or gender differences in the effect of exercise on psychological outcomes, however, the length of a program appears to have an effect with longer programs having a more consistent and beneficial effect.

Despite the evidence of significant improvements in both an exercise training effect (i.e. increase in cardiovascular fitness) and psychological well-being assessments, several studies found that these results were unrelated. The authors therefore suggest that the observed impacts on psychological well-being may be a factor of participation itself rather than a factor of the resultant increases in fitness. Several of the studies reviewed in this article are characterised by relatively small sample sizes. In addition, the consistency, sensitivity and construct validity of assessment scales used for assessing psychological well-being responses to exercise is questioned and the authors stress that previous research has failed to establish a clear casual link between participation and improved psychological well-being.

34. McGowan, R., Peirce, E.F. and Jordan, D. (1990) "Mood Alterations with a Single Bout of Physical Activity", Perceptual and Motor Skills, Vol. 72, pp 1203-1209.

Impact: mood
Population: college students
Methodology: multivariate quantitative
Country: USA

Authors' abstract

Although numerous studies have examined the relationship among affect, personality, and physical activity, results are equivocal. Critics have cited inadequate experimental designs and analyses as the bases for ambiguity. This study addressed two identified weaknesses, length of exercise regimen and improper selection of subjects. Subjects were 72 college-age students who participated in one of three 75-minute activity classes (running, karate, weight lifting) and a lecture class (control subjects). The Profile of Mood States Test was administered prior to and immediately after exercise bouts. Analyses of variance and multiple *t* tests indicated that participating in a single bout of exercise significantly reduced reported total mood disturbance, tension, depression, anger, and confusion.

Additional comments

A sample of 72 college students volunteered to participate in this study. Subjects were recruited from three activity classes (karate, n = 11; weight training, n = 26; jogging, n = 25) and an exercise science lecture course (n = 10).

The Profile of Mood States Test was administered to all subjects prior to and immediately following the 75 minute class. Scores were obtained for each of the subscales of Tension-Anxiety, Depression-Dejection, Anger-Hostility, Vigour-Activity, Fatigue-Inertia, Confusion-Bewilderment and the global mood disturbance measure. Multivariate Analysis of Variance with repeated measures, ANCOVA and multiple *t* test techniques were used to examine the relationships between mood changes and physical activity participation.

It was found that participation in a single session of exercise may produce positive changes in mood in normal college-age individuals. Overall, students in the exercise classes demonstrated significant positive changes in the total mood disturbance measure as well as the subscales of Tension, Depression, Anger and Confusion. Significant differences between the pre- and post- measures of mood were obtained for the running and weight lifting groups, with members of the running group reporting significant improvement in the total mood measure and the subscales of Tension and Confusion, while for the weight training group their was a significant improvement in Confusion (and a significant increase in Fatigue). No significant differences were obtained for either the karate group or the lecture control class. It is suggested that participation in the karate classes may not have been of sufficient intensity to facilitate changes in mood. Based on these results the authors conclude that a single session of exercise may be sufficient to produce positive changes in mood. It should be noted that this study uses pre-existing classes in which students are voluntarily enrolled rather than random allocation to treatment and control groups.

35. McLean, D.D. & Neal, L.L. (c1996) The Benefits of Recreation in a Winter Environment. [online] Available www.indiana.edu/~naspd/values/iwcbenefits.html [November 2000].

Impact: personal well-being, mood, self-esteem, social cohesion, crime prevention
Population: general population
Methodology: literature review
Country: USA, Canada

Authors' abstract not provided

Additional comments

This paper briefly discusses four identified categories of recreation benefits: physiological and psychophysiological; psychological; sociological; and economic and environmental. The specific focus of this article is on winter recreation, which the authors argue can provide a strong impetus for personal and community well-being. Much of what is reported as applying to winter settings is generalised from detailed studies of recreation benefits in a variety of settings.

It is concluded that physical recreation is associated with benefits in physiological and psychological well-being. In addition it is claimed that physical recreation may offer benefits in the development of social cohesion and may be of assistance in dealing with the issues associated with youth-at-risk. It should, however, be noted that these conclusions are based on a review of a relatively small number of studies and much of the benefits described are discussed from a theoretical rather than an empirical standpoint. The authors mention several issues that need to be considered when studying benefits, including intervening variables that make identification and measurement of benefits difficult. Also, in some instances the measurement of benefits is confounded by variables that contribute to the measurement, including age, physical condition, type and level of activity and mental health.

36. Maroulakis, E. & Zervas, Y. (1993) "Effects of Aerobic Exercise on Mood of Adult Women", Perceptual and Motor Skills, Vol. 76, pp. 795-801.

Impact: mood
Population: women
Methodology: multivariate quantitative
Country: other (Greece)

Authors' abstract

The purpose of the present study was threefold, to examine (a) whether participation in an aerobics class produces an enhancement in the mood state of exercising women, (b) whether any effects persist 24 hours later, and (c) whether exercising in the morning or in the afternoon leads to differential effects. 99 women, aged 19 to 55 years, participated. Of 77 members of a fitness club who formed the treatment group, 28 exercised in the morning and 49 in the afternoon. The control group consisted of 22 non-exercising female clerks. The Profile of Mood States was administered just prior to and immediately after an aerobics class, as well as approximately 24 hours later. Members of the control group completed the Profile at their workplaces, following an identical time pattern. Analysis indicated a significant beneficial effect of exercise at both times of day on all dimensions of mood. 24 hours later, mood scores had not fully regressed to pre-exercise levels. The control group's over-all mood profile was poorer and their responses remained basically unaltered across administrations.

Additional comments

The sample in this study included 99 women ranging in age from 19 to 55 years (mean age = 28.8 years). Seventy seven participants were members of a privately owned fitness club and reported exercising regularly for approximately one month prior to the study. This group was further divided into those who exercised in the morning (n = 28) and those who exercised in the afternoon (n = 49). The control group consisted of 22 sedentary women who held clerical jobs.

Members of both the morning and afternoon exercise groups participated in a 30 minute aerobics class. Participants monitored their own heart rate to provide an indication of the aerobic exercise load. The Profile of Mood States (POMS) was administered to subjects in all three groups. The exercise groups completed the POMS 10 minutes prior to their exercise session, immediately after exercise and at the same time on the following day. The control group completed the POMS questionnaire while at work but followed the same time pattern. Scores on each of the subscales (Tension, Depression, Anger, Vigour, Fatigue, Confusion) and the composite score were investigated with a 3(group) x 3(time of assessment) Multivariate Analysis of Covariance, using initial values as the covariates.

Members of the exercise groups reported significant improvements in mood across each of the subscales. Results from testing the following day indicated that while some of the reported gains between primary and secondary testing had been lost, the total mood disturbance score remained significantly lower than pre-exercise levels. It was found that there were no differences between the effects of morning and afternoon exercise on mood. It is important to note, however, that members of the control group also reported significant improvements to pretest POMS measures during the post-test phase. As such these findings do not clearly establish the relative benefits of exercise and non-exercise on mood. In addition, this study did not randomly allocate participants to the three groups but used pre-existing groups of morning, afternoon and non-exercisers such that self-selection is likely

to have influenced the results. The sample sizes for each of the groups were also relatively small. Although results suggested that benefits in overall mood persisted for 24 hours, repeated measures over the longer term would be required to investigate the enduring mood benefits of participation in exercise.

37. Melnick, M.J., Sabo, D.F. and Vanfossen, B. (1992) "Educational Effects of Interscholastic Athletic Participation on African-American and Hispanic Youth", Adolescence, Vol. 27, No. 106.

Impact: development of life skills
Population: adolescents in ethnic minorities
Methodology: descriptive quantitative
Country: USA

Authors' abstract

This study examined the educational effects of interscholastic athletic participation on a national, stratified, probability sample of African-American and Hispanic boys and girls drawn from the High school and Beyond Study (U.S. Department of Education, 1987). This two year longitudinal analysis was based on questionnaire data from 3, 686 minority youth who were sophomores in 1980 and Seniors in 1982. The independent variable was athletic participation, and the dependent variables included senior year popularity, extracurricular involvement, grades, achievement test performance, drop-out rates, and educational expectations. The control variables were socioeconomic status, school location, and sophomore measures of the dependent variables. In general, athletic participation enhanced popularity and contributed to greater involvement in extracurricular activities. Sports participation was generally unrelated to grades and standardised test scores. Depending on school location (i.e. urban, suburban, rural), athletic participation was significantly related to lower drop-out rates for some minority youth. High school athletic participation was unrelated to educational expectations in the senior year. These findings show that high school athletic participation was a *social* resource for many minority youth, but only a modest academic resource for others. Equally clear, however, is the fact that not all racial or ethnic groups reap the same benefits from sport. More importantly, these findings strongly suggest that high school sport should only be considered *one* of many institutional forces converging in the lives of American minority youth. To assign sport more significance than these findings call for is to run the risk of oversimplifying and trivialising the very complex psychological processes which attend high school athletic participation.

Additional comments

The data used in this study was taken from the High School and Beyond study, a longitudinal analysis which surveyed 14, 366 high school students who were sophomores in 1980, with follow-up interviews conducted with the same subjects in 1982, 1984 and 1986. The High School and Beyond study employed a stratified probability sample to select high school students enrolled in both public and private high schools across the United States. This study focussed on the data obtained in 1980 and 1982 from 3,686 black and Hispanic students.

A selection of measures from the High School and Beyond study were included in these analyses. The dependent variables included were self-reported popularity, participation in extra-curricular activities, educational aspirations (all measured by questionnaire items), achievement test performance (measured by a composite score based on performance in reading, vocabulary and maths) and drop-out rate (measured as whether the respondent completed high school or not). The independent variable, athletic participation was measured from questionnaire items referring to involvement in athletic teams during both sophomore and senior years. Socioeconomic status, school location (urban, suburban or rural), gender, ethnicity and sophomore levels of the dependent variables were also obtained as control variables. Twelve subgroups were constructed from all possible combinations of gender,

ethnicity and school location. Multiple regression analyses were performed for the total sample as well as for the different subgroups.

The overall conclusion is that athletic participation is associated with positive influences on social aspects but has little association (positive or negative) with academic aspects of school life for black and Hispanic high school students. Analyses revealed that athletes self-reported popularity was greater than that for non-athletes. Similarly, athletes reported greater involvement in extra-curricular and community activities when compared with non-athletes. However, benefits in terms of academic factors were only evident in a small number of specific subgroups. Grade point average was only predicted by athletic participation for black males who attended suburban schools and Hispanic females who attended rural schools. Similarly, achievement test performance was only related to degree of sports participation for two of the 12 subgroups and school drop out rates were related for three subgroups. Participation in sports had no influence on educational expectations except for rural Hispanic males who actually experienced a decline. This study therefore concludes that the potential impacts (both positive and negative) of athletic participation on minority youth, particularly in relation to educational factors, may have been overestimated.

38. Miller, K.E., Sabo, D.F., Melnick, M.J., Farrell, M.P. and Barnes, G.M. (2000) The Women's Sports Foundation Report: Health Risks and the Teen Athlete. East Meadow, NY: Women's Sports Foundation. Also available online at www.womenssportsfoundation.org/cgi-bin/iowa/issues/body/article.html [May 2001].

Impact: social behaviour, personal well-being
Population: adolescents
Methodology: multivariate quantitative
Country: USA

Executive summary

This study provides an objective assessment of the relationship between sports and adolescent health. American teenagers today encounter a wide range of potential health risks, and the choices they make can determine not only their health and well-being but their very survival as well. How does sports participation fit into the preventive picture of teenage health in the United States?

Athletic participation is ordinarily seen by athletes, coaches, parents, and other interested parties as a route to good health and social success. However, popular beliefs about sport also emphasise the need to take chances; our most respected athletes have been those who took risks on the field, court, or track and made them pay off. Risk-taking sometimes reflects courage, shrewdness, and strength of will; but it can have negative long-term health effects as well. The present study suggests that each of these messages resonates in the lives of adolescent athletes.

The Women's Sports Foundation Report: Health Risks and the Teen Athlete offers a comprehensive evaluation of the linkages, both positive and negative, between sport and adolescent health risks. The Women's Sports Foundation presents these findings in order to foster serious dialogue over the benefits and risks of adolescent athletic participation. That sports have positive impacts on many young people's lives cannot be argued. The Women's Sports Foundation promotes increased opportunities for girls and women in sports and fitness; however, the Foundation also recognises that sport is not a perfect institution. This report analyses some of the multifaceted connections of the sports experience to the health, safety, and fitness of American teenagers.

We explore the ways in which sports and health risks are related for both girls and boys in this study. It is clear that girls and boys have, more than ever today, a shared stake in athletics. Over the past few decades, as girls and women have flooded into what was once the exclusive purview of boys and men, a central question has arisen: Will female athletes embrace the traditional masculine sport culture, adopting risky behaviour patterns previously associated with males? Or will they transform the institution of sport as we know it, making it a safer and healthier setting for both girls and boys? As the dialogue continues, this report makes a unique and necessary contribution to the debate.

The findings and conclusions of this report were derived from analysis of the 1997 Youth Risk Behaviour Survey, a nationally representative survey of 16,262 public and private high school students in grades 9 through 12, developed by the Centers for Disease Control and Prevention. The Youth Risk Behaviour Survey is conducted biannually to assess the prevalence of youth behaviours that influence health outcomes. It includes, but is not limited to, data on suicidal thoughts and attempts; perceptions and behaviours related to body image

and weight loss, vehicular risk-taking (including seat belt use and driving under the influence of alcohol); and substance use (tobacco, alcohol, and other illicit drug use, including anabolic steroids). We carried out logistic regression analyses to compare athletes' and non-athletes' odds of engaging in each of these health-risk behaviours. Where appropriate, comparisons were also made with "highly involved" athletes (that is, teenagers who reported participating in three or more sports teams over the course of the year prior to the survey).

Additional comments

This report examines the relationship between sports participation and risk taking behaviour amongst adolescent. In particular the focus is on determining whether the increasing numbers of adolescent females participating in sport are adopting the risk-taking habits historically associated with young male athletes.

The study uses data from the 1997 Youth Risk Behaviour Survey, a nationwide biannual survey of high school students in grades 9-12. The sample for this survey was selected using a three stage cluster design and included approximately 16,000 students. Respondents provided details about their participation in team sports during the previous 12 months and answered questions relating to body image and participation in risk-taking behaviour. Of the students selected in the sample 51% of girls, and 68% of boys, had been involved in at least one team during the previous 12 months. The report compares the prevalence of risk-taking behaviour amongst athletes and non-athletes for both sexes using logistic regression and odds ratios. Odds ratios express the likelihood that members of a particular group will engage in risk taking behaviour compared to the likelihood that persons outside that group will do so. An attempt was made to control for associated factors, including age, race/ethnicity, social class, and type of residential area. Eight categories of risk-taking behaviour are examined - illicit drug use, anabolic steroid use, alcohol use, tobacco use, suicide, body image and weight loss and vehicular risk. For some categories additional analysis was conducted on 'highly involved' athletes (those who participated in three or more teams during the previous year).

It is concluded that sports participation amongst adolescents may be a buffer against particular forms of risk-taking behaviour, but may be associated with increased risks in other areas. Compared to non-athletes, both male and female athletes were less likely to have used illicit drugs, to smoke cigarettes or to display suicidal thoughts or actions. Athletes of both sexes were also more likely than non-athletes to have a positive body image. However, on the other hand female athletes were more likely than female non-athletes to diet or be engaged in weight loss strategies. It was found that neither male or female athletes were any more likely than their non-athletic counterparts to engage in binge drinking, however highly involved athletes of both sexes were somewhat more likely to engage in such behaviour. Male athletes no more likely to use steroids than male non-athletes, however female athletes and highly involved males were more likely to use steroids than non-athletes, although the overall incidence of steroid use amongst both sexes, particularly females was low. Female athletes more likely to wear seatbelts when driving, but female athletes and highly involved athletes of both genders were more likely to drink and drive.

The report closes by discussing possible explanations for the observed results including negative factors which may impact on young athletes such as pressure to assimilate, sensation seeking and the impact of professional role models, and positive factors such as structure leisure time and constructive supervision. Various policy options to promote the health of adolescent athletes are discussed and a number of options for future research are proposed.

When considering the results of this study the focus on organised team sports should be noted. In addition, despite evidence of associations between participation and risk-taking behaviour, causality cannot necessarily be assumed.

39. Netz, Y. & Jacob, T. (1994) "Exercise and the Psychological State of Institutionalized Elderly: A Review". Perceptual and Motor Skills, Vol. 79, pp. 1107-1118.

Impact: personal well-being, mood
Population: institutionalised older persons
Methodology: literature review
Country: USA

Authors' abstract

The present review examined the hypothesis that exercise facilitates psychological processes among institutionalized geriatric and psychogeriatric elderly persons. Studies of long-term psychogeriatric patients showed significant cognitive change following a period of moderate aerobic exercise. However, no lasting cognitive effect of long-term exercise was observed for those who became mentally ill or physically impaired in old age or who could not tolerate strenuous exercise. On the other hand, improvement in cognitive function was reported immediately following an exercise session among geriatric institutionalized patients. Neither long-term nor short-term exercise brought about changes in affect. Although most studies suffer serious methodological shortcomings, the common finding of improved cognitive function immediately following exercise suggests that physical activity does have some arousal effect on cognition in institutionalized elderly persons. More studies are needed to clarify the immediate versus long-term effect of exercise on psychological variables among institutionalized elderly as well as the relationship between physical fitness and cognitive change.

Additional comments

This review looks at the effect of exercise on psychological variables among institutionalised elderly persons. A small number of articles are reviewed with the authors noting a general lack of research focusing on this specific population.

Based on the results of the studies reviewed, the authors conclude that while exercise programs commonly result in short term improvement in cognitive function, long term psychological benefits may not be achieved without a concurrent physiological improvement. This supports the notion that exercise induced benefits to psychological health may be reliant on sufficient exercise intensity. In addition, it is concluded that exercise is limited in its ability to improve irreversible changes that have occurred in the central nervous system of frail elderly and that those persons in better physical condition may display greater psychological benefits from physical activity. The use of unsuitable measures, i.e. depression scales which are not sensitive to mood change, is considered a factor in some of the studies reviewed.

The authors recommend the need for future research to clearly differentiate between immediate and long-term effects of exercise. For example, if post-exercise tests of long-term studies are performed immediately after exercise, it is unclear whether the observed changes reflect acute or chronic effects.

40. Nichols, D. & Fines, L. (1995) "Self-Concept, Attitude and Satisfaction Benefits of Outdoor Adventure Activities: The Case for Recreational Kayaking", Journal of Leisurability, Vol. 22, No. 2, pp. 38-44.

Impact: self esteem, development of life skills
Population: adults with mental disabilities
Methodology: multivariate quantitative, program evaluation
Country: Canada

Authors' abstract not provided

Additional comments

Eight participants with traumatic brain injury were recruited from both rehabilitative and recreational facilities in Victoria, British Columbia for this study. Subjects were aged between 19 and 55 years and were selected based on a number of criteria relating to the nature of their injuries and their abilities.

All subjects participated in a 12 week recreational kayaking program which involved one 90 minute session per week. Subjects were paired with program assistants for individual support and assistance. Three questionnaires were administered to participants prior to and following the program. The Tennessee Self Concept Scale (TSCS) measured the participants' perceptions on 6 different subscales: physical self, social self, personal self, self satisfaction, behaviour and identity. The Leisure Satisfaction scale was used to measure the extent that participants felt their general "needs" were met through leisure. Cognitive, affective and behavioural aspects of subjects' attitudes towards leisure were measured by the Leisure Attitudes scale. T-test analyses were used to determine the differences between pre- and post-test scores.

Results showed statistically significant increases from pre- to post- measures on all scales of the TSCS indicating that subjects experienced enhanced feelings in a range of areas of self-worth and self-esteem. Similarly, significant gains were evident for all components of the Leisure Satisfaction measure after participation in the kayaking program. The affective and behaviour components of the Leisure Attitudes measure showed significant improvements between pre- and post- test scores, however the cognitive component (knowledge of leisure benefits) did not appear to be influenced by participation in the kayaking program. Although these results suggest that participation in physical recreation may be beneficial for adults with traumatic brain injury there are a number of methodological limitations which are acknowledged by the authors. The relatively small sample size and the non-random selection of participants (selection was based on a number of specific criteria including convenience) limit the generalisability of these results. Similarly, as a control or alternative treatment group was not used in this study results cannot necessarily be attributed to the kayaking program.

41. Norris, R., Carroll, D. & Cochrane, R. (1992) "The Effects of Physical Activity and Exercise Training on Psychological Stress and Well-Being in an Adolescent Population", Journal of Psychosomatic Research, Vol. 36, No. 1, pp. 55-65.

Impact: mood
Population: adolescents
Methodology: multivariate quantitative
Country: UK

Authors' abstract

To determine whether participating in physical activity affects psychological well-being in an adolescent population, 147 adolescents completed self-reports of exercise and psychological stress and well-being. Analysis revealed that those who reported greater physical activity also reported less stress and lower levels of depression. Adolescents who experienced a higher incidence of life events also demonstrated a strong association between stress and anxiety/depression/hostility. To investigate the effects of exercise training on psychological well-being adolescents were assigned to either high or moderate intensity aerobic training, flexibility training or a control group. The training groups met twice per week for 25-30 minute Aerobic fitness levels, heart rate, blood pressure and self-report of stress and well-being were measured prior to and following 10 weeks of training. Post-training fitness measures confirmed the effectiveness of the high intensity aerobic exercise and between groups differences for physiological and some psychological measures were found. Subjects undergoing high intensity exercise reported significantly less stress than subjects in the remaining three groups. The relationship between stress and anxiety/depression/hostility for the high intensity group was considerably weakened at the end of the training period. For the remaining subjects, however, this relationship was, if anything, strengthened. This experiment provides evidence to suggest that in an adolescent population, high intensity aerobic exercise has positive effects on well-being.

Additional comments

This article reports on the results of two separate studies. The first involved a sample of 147 students (70 males and 77 females) from a secondary school in the Leamington area of Warwickshire in the United Kingdom. These students ranged in age from 13 to 17 years (mean age = 14 years, 3 months). The second study used a total sample of 80 students; 60 students who were enrolled in the lower sixth form at the same school and a further 20 students from a neighbouring school.

In the first study, questionnaires were administered to students during class time. The Life Events Questionnaire (LEQ) measured experiences of stress inducing situations while the Perceived Stress Scale measured subjective stress levels. A modified version (for adolescents) of the Seriousness of Illness Rating Scale (SIRS) assessed physical health and the Multiple Affective Adjective Check List (MAACL) was used to measure levels of anxiety, depression and hostility . A measure of general exercise habits (incorporating duration and intensity measures) was also included. Correlational analyses investigated the relationships between these variables.

The second study investigated the role of physical exercise as a buffer between stress and illness and also on whether exercise intensity was a factor in this. Many of the same measures (LEQ, SIRS, MAACL and PSS) as used in Study 1 were analysed in Study 2, however an additional measure of fitness, the Louisiana State University step-test, was included. The 60

participants from the first school were organised into three groups based on their free lesson time and each group was randomly assigned to one of three training programs which varied in respect of exercise intensity. These groups were: high intensity aerobic exercise (n = 22), moderate intensity aerobic exercise (n = 19) and flexibility training (n = 19). The 20 students from the neighbouring school comprised the control group. Each training group completed two supervised exercise sessions of 25-30 minutes per week for a period of 10 weeks. One factor Analysis of Covariance where the pre-intervention measures were used as the covariate were used to analyse the data. Post-hoc comparisons using the Newman-Keuls method were also conducted.

Study 1 found statistically significant relationships between exercise and perceived stress, and exercise and depression such that higher levels of exercise were associated with lower levels of stress and depression. The second study found that the high intensity training group reported significantly lower levels of stress and anxiety than the other exercise and control groups, however there were no significant differences between the groups in relation to depression and hostility. Further analysis also revealed that the relation between stress, anxiety and depression was significantly weakened at the end of the training period for members of the high intensity group. However, this was not true for the other three groups. It is concluded that aerobic training has positive benefits for psychological well-being and stress in an adolescent population but only when it is of sufficient intensity. The correlational nature of this study should be noted when interpreting these results.

42. Ontario Ministry of Culture, Tourism and Recreation and the Ministry of Health (1995) Benefits and Impacts of Physical Activity for Ontario, Report on Issues One and Three. [online] Available www.lin.ca/lin/resource/html/benimpac.htm#117 [November 2000].

Impact: mood, crime prevention, self-esteem, personal well-being, social behaviour
Population: general population, youth-at-risk
Methodology: literature review
Country: Canada

Author's abstract not provided

Additional comments

This paper presents a discussion of the relationship between physical activity and mental health (anxiety and stress, emotional well-being, depression, satisfaction), physical activity and community health (crime, substance abuse, productivity) and physical activity and human development (self-esteem, self-efficacy).

The author states that physical activity has been found to be consistently related to reduced levels of stress, anxiety and depression in a diverse range of settings and with a variety of populations. A positive association between physical activity and emotional well-being is also claimed. However, it is stressed that previous research has been successful merely in showing a degree of association between these variables and it is acknowledged that further research is required to fully explore the nature of the relationship between physical activity and mental health. In particular the impact of external factors and the issue of causality remains unclear.

The article mentions that while there is much support for the notion that physical activity is positively associated with each of the community health variables, limited broad-based research has been conducted to investigate these relationships particularly over the longer term. In addition few studies have accounted for external factors when examining the links between physical activity participation and community health.

In terms of self-esteem it is claimed that results from a wide range of research indicates that physical activity has a positive causal effect on self-esteem in adults. There is strong evidence of a reciprocal relationship between self-efficacy and physical activity. However it is acknowledged that self-efficacy is also a strong predictor of physical activity participation and, further, has a mediating effect on other psychological variables. The methodological limitations of much of the research in this area, such as lack of control conditions and poor sampling techniques are also discussed, and should be noted when considering the conclusions drawn.

The authors make note of several limitations to the research reviewed and suggest further research needs to examine which characteristics of physical activity (type, level, duration, intensity) have an effect on mental health, community health and human development outcomes as well as establishing the directional nature of these relationships. The authors consider the use of inappropriate or poorly designed measures is an issue to be addressed for future research in the physical activity context. Finally, while the paper refers to the findings of a variety of studies, it is unclear precisely how extensive a range of literature was considered in drawing the conclusions of this article.

43. Petrakis, E. & Bahls, V. (1991) "Relation of Physical Education to Self-Concept", Perceptual and Motor Skills, Vol. 73, pp 1027-1031.

Impact: self-esteem
Population: children
Methodology: multivariate quantitative
Country: USA

Authors' abstract

This study investigated the relation of an elementary school program in physical education to the self-concepts of children in Grades 1 to 4. Two parochial schools were selected, one with a physical education program ($n = 126$ children) and one without such a program ($n = 86$ children). The Martinek-Zaichkowsky Self-concept Scale was administered during the first two weeks of September and again during the last two weeks of April. A 2 (pre-/post-test) x 2 (group) x 4 (grade) analysis of variance with repeated measures on the first factor was used to analyse each measure, with *post hoc* tests to follow up. The self-concept results indicated that physical education did not enhance the self-concepts of children, except for those children in the second grade.

Additional comments

Subjects in this study were elementary school children (from grades 1 to 4) who attended one of two schools in the United States. The selected schools were chosen based on similarities in student socioeconomic background, however they differed in that one had a pre-existing physical education program while the other didn't. The sample included 126 from the school with regular physical education classes and 86 students from the school without physical education classes.

Students who attended the school with the physical education program were involved in a 30 minute physical education class twice a week which included a number of different physical activities. Children who attended the other school had a 30 minute recess period each day but were not involved in any structured physical education activities. The dependent variable of global self-concept was measured by the Martinek-Zaichowsky Self-concept scale. The scale was administered by teachers during the first two weeks of semester to obtain pre-test measures and then again after 30 weeks for post-test assessments. A 2(time) x 2(group) x 4(grade) split-plot analysis of variance was used to evaluate differences in self concepts.

Results indicate that participation in physical education did not enhance the self-concept of these elementary school children. Rather, this study found that on average self-concept declined with age, regardless of physical education participation. It should be noted that this study used pre-existing groups rather than random allocation. As such, control and treatment groups displayed some differences in initial (pre-treatment) measures of self-concept, and this may have impacted the observed results. In addition, the authors concede that a number of environmental and social factors outside the bounds of this study may also influence children's self-concepts, for example, participation in sports or physical activities outside of physical education classes.

44. Pierce, E.F. & Pate, D.W. (1994) "Mood Alterations in Older Adults Following Acute Exercise", *Perceptual and Motor Skills*, Vol. 79, pp. 191-194.

Impact: mood
Population: aged women
Methodology: multivariate quantitative
Country: Canada

Authors' abstract

Limited research indicated positive affective change following acute bouts of exercise, but whether this improved affect among younger subjects may be generalised to older individuals is not known. The present study, then, examined the effects of a single bout of physical activity among older participants. 16 trained women ($M_{\text{age}} = 64.5 \pm 7.6$ year) completed an abbreviated Profile of Mood States prior to and immediately following a 75-minute session of aerobic line dancing. A series of one-way analyses of variance with repeated measures were used to examine differences between pre- and post-test sub-scores on mood states. Significant decreases following exercise in scores on Tension, Depression, Fatigue, and Anger and a significant increase in scores on Vigor relative to pre-exercise (control) scores were found. Global mood was significantly improved after the exercise session. No significant difference was found between pre- and post-exercise measures of Confusion. Previous findings of significant improvements in affect immediately after an acute bout of exercise may be generalised to older adults. Repetition with a non-exercised control group is desirable.

Additional comments

The sample in this study consisted of 16 older women (mean age = 64.5 years) who had participated in aerobic line dancing for at least 6 months prior to the study.

The Profile of Mood States was administered to all participants prior to and immediately following a 75 minute session of aerobic line dancing. The POMS includes six subscales: Tension, Depression, Fatigue, Anger, Vigour and Confusion. A series of one-way ANOVAs with repeated measures was conducted to assess the differences in pre- and post- scores for each of these subscales as well as the composite score.

The results of this study indicate that mood significantly improved after participation in an aerobic line dancing class. A statistically significant decrease from the pre- to post- measures was observed for the Depression, Tension, Fatigue and Anger subscales. Similarly, statistically significant increases on the Vigour subscale and composite measure were observed. There were no significant differences between the pre- and post- measures on the Confusion scale. While the authors conclude that even a single bout of exercise may produce positive changes in affect among older adults, they recognise that further research is required. A causal relationship can not necessarily be concluded without the inclusion of control group comparisons.

45. Plante, T.G. and Rodin, J. (1990) "Physical Fitness and Enhanced Psychological Health", Current Psychology: Research and Reviews, Vol. 9, pp. 3-24.

Impact: personal well-being, mood, self-esteem
Population: general population, participants, non-participants
Methodology: literature review
Country: USA

Authors' abstract

A great deal of attention has been given to the association between physical fitness and psychological health. The purpose of this view is to examine recent developments in the burgeoning exercise and psychological health literature and to explore avenues for future research. The current review focuses on research that has examined enhancement of psychological health and well-being among non-clinical populations since 1980. Four areas of psychological functioning are reviewed: (1) psychological well-being and mood, (2) personality and self-concept, (3) physiological stress responsivity and (4) cognition. Exercise appears to improve mood and psychological well-being as well as enhancing self-concept and self-esteem. Exercise appears to do little for personality functioning. Furthermore, mixed empirical support exists to suggest that exercise influences stress responsivity and cognitive functioning. However better research designs and procedures are still needed. Theories regarding the connection between exercise and psychological functioning as well as suggestions for future research are offered.

Additional comments

This review examines a range of studies, published during or after 1980, that investigate the relationship between physical activity and psychological health. The article discusses 41 studies assessed by the authors to be of a sufficient methodological standard, where the primary focus is on observing the impacts of physical activity on the 'normal population' (i.e. excluding studies which focus on clinical populations).

The majority of the studies reviewed suggest that exercise is associated with improved well-being and mood and elevated levels of self-esteem. Limited support is also found for the notion that exercise is associated with reductions in stress, anxiety and depression. Most studies which find evidence of beneficial effects of exercise have primarily focused on short term benefits. Some evidence also exists which indicates that long-term exercise programs may offer cumulative benefits to psychological well-being, however studies of this nature are less numerous and the results are generally less conclusive. Little support is found in relation to associations between exercise participation and improved cognitive functioning.

The article also discusses the findings of a number of studies which examine the psychological differences between exercisers and non-exercisers. The authors note that to some extent the associations observed between exercise and psychological variables may be a reflection of inherent differences between exercisers and non-exerciser rather than a factor of participation.

Many of the studies reviewed are subject to methodological limitations and, consequently, the authors recommend that future research should employ experiments that have adequate control groups and random assignment to treatment conditions, as well as using validated measurement instruments. In addition, the authors suggest that further research is required to identify the effects of different types of exercise (intensity, frequency, group/individual).

46. Sakofs, M. (1992) "Assessing the Impact of The Wilderness Alternative for Youth Programme: An Outward Bound Programme for Adjudicated Youth, The Journal of Adventure Education and Outdoor Leadership, Vol. 9, No. 4, pp. 16-21.

Impact: social behaviour, development of life skills
Population: youth-at-risk
Methodology: program evaluation, multivariate quantitative
Country: USA

Author's abstract

This is a synopsis of the results of a three year research effort designed to assess the impact of the WAY Programme conducted by the Pacific Crest Outward Bound School. WAY is an acronym for Wilderness Alternatives for Youth and it represented a newly conceived treatment programme for adjudicated youth which was designed to integrate an intervention strategy known as Wilderness or Adventure Therapy, with a community based component. The term Wilderness in WAY title refers to the wilderness/adventure element of the programme; Alternatives refers to the fact that participation in this programme represented one of several options available to the youth offenders from which these subjects were selected and Youth refers to the population for which this programme was designed to serve, i.e. young people 14-17 years of age.

The 115 participants in this study were randomly assigned to either the Control or Experimental group. Data on these subjects were gathered through four basic strategies, i.e. 1) a battery of self report instruments administered prior to and several times after the WAY experience, 2) collateral measure in the form of questionnaires administered to parents, teachers and counsellors, 3) a review of school and court records for specific and official behavioural data, and 4) a formal qualitative investigation of all aspects of the programme.

Complementing the interview process associated with the qualitative component, SPSS/PC+ Repeated Measures analyses and Crosstab analyses were used to examine data extracts from the self-report, collateral and behavioural instruments. The result of the SPSS/PC+ Repeated measures analyses revealed statistically significant interactions, at or beyond the .05 level, between the Control and Experimental group subjects for the following scales: Locus of control, Asocial orientation, Manifest aggression, Values orientation, Immaturity, Withdrawal-depression, Social anxiety, Repression, Parental assessment of their child's dependency and A counsellor's assessment of a child's peer relations.

Though SPSS Crosstab procedures revealed no statistically significant differences between the Control and Experimental groups on a variety of behavioural measures, the results of the structured interviews conducted with more than 17 individuals associated with the project, did provide important insight into the global impact of the WAY programme and these behavioural measures.

More specifically, the structured interviews not only revealed a great deal of support for the WAY programme among participants, significant others of programme participants and county caseworkers, but in addition, a powerful and critical overarching treatment effect which suggested that though Experimental group members may have reverted to old patterns of behaviour upon returning from WAY, because they had experienced success on Outward Bound, i.e. doing constructive and positive things which seemed extraordinary while simultaneously learning alternatives to their dysfunctional behaviours, they now knew they

could change if they so desired and that there was a better world available. Thus, the statistically significant changes recorded on the various psychometric instruments seem to be indicative of profound and fundamental changes which have taken place in the hearts and minds of the WAY participants, i.e. changes which are essential precursors to behavioural changes. Thus it appears that the impact of WAY was real, positive, appreciated by those who participated and fundamental to future growth for the population served.

Additional comments

The sample in this study consisted of 115 adolescents who volunteered to participate in the Wilderness Alternative for Youth Programme (WAY). These adolescents were selected from a pool of youth offenders based on recommendations by court counsellors and a screening process carried out by program representatives. The final sample used for the analyses consisted of 40 boys and girls between the ages of 13 to 18 years who completed the required measures.

Participants were randomly assigned into a control or experimental group. The experimental group took part in a three week wilderness program which included adventurous activities (such as camping, hiking and rock climbing) and community service activities. Those in the control group participated in a single three hour practical course without a physical activity component.

A number of measures were administered to both the control and experimental groups at four different times; pre-course (Time 1), immediate post-course (Time 2), 3 month post-course (Time 3) and one year post-course (Time 4). Included in these measures was a battery of 33 tests which were taken from the Self Description Questionnaire, the Jesness Inventory, the Student Attitude Questionnaire, Nowicki Locus of Control scale and the PRF Achievement Motivation Scale. Parents, teachers and counsellors also completed a number of behaviour measures (school attendance, alcohol and drug use, discipline problems at school and criminal allegations pending) and the Child and Adolescent Adjustment Profile (CAAP; at Times 3 and 4).

Results indicated statistically significant differences between the experimental and control groups on 10 of the scales. The control group displayed significantly better results than the experimental group on the scales of: locus of control, asocial orientation, manifest aggression, values orientation, immaturity, withdrawal-depression, social anxiety, repression, CAAP - Parental assessment of dependency and CAAP - counsellor assessment of peer relationships. However, no statistically significant differences between groups were observed for the behavioural measures. In conclusion it seems that the WAY programme had a positive effect on those who participated but only for the psycho-social aspects measured by the scales. These effects were not translated to changes in behaviour. The authors suggest that the observed changes in thoughts and feelings may be precursors to changes in behaviour in the long term, however, additional follow up research would be required to test this.

47. Smale, B.J.A. & Dupuis, S.L. (1993) "The Relationship Between Leisure Activity Participation and Psychological Well-being Across the Lifespan", Journal of Applied Recreation Research, Vol. 18, No. 4, pp. 281-300.

Impact: mood, personal well-being
Population: general population
Methodology: descriptive quantitative
Country: Canada

Authors' abstract

The purpose of this study was to investigate the relationship between participation in selected leisure activities and psychological well-being across the lifespan. Data were drawn from the *1988 Campbell's Survey on Well-being in Canada* (n = 4,345). The independent variables drawn from the data set dealt with leisure activity participation and, in order to include lifespan, the age, and sex of the respondents. Six activities were selected which emphasised passive, social, and physically active forms of leisure. Psychological well-being - the dependent variable - was measured using the Bradburn Affect Balance Scale. The results showed that older age groups had greater feelings of psychological well-being and that this was true for both sexes. In addition, participation in all activities, except television viewing, was positively associated with psychological well-being. The effects of participation on well-being were independent of those associated with age for all activities except hobbies and crafts. Passive and social activities showed stronger relationships with psychological well-being than physically active pursuits. Passive activities typically done alone such as hobbies and crafts may have the strongest positive affects on psychological well-being due to a sense of personal achievement. The importance of both individual leisure activity participation and leisure lifestyle diversity to psychological well-being across the entire lifespan needs to be explored further.

Additional comments

This study used data obtained by the Campbell's Survey on Well-Being in Canada which was conducted in 1988 to gather information about the recreation and physical fitness habits of the Canadian population. A total of 4,345 individuals were surveyed, with respondents selected using a stratified multistage cluster sample of households. For the purposes of this analysis the responses from of 3,894 participants ranging in age from 11 to 80 years were selected.

The dependent variable of interest was Psychological Well-Being as measured by the Bradburn Affect Scale. The independent variables were measures of frequency of participation in various leisure activities. Three general categories of leisure were investigated: 'passive activities', 'social activities' and 'physical activities'. Each category was made up of 2 specific activities. For the 'physical activities' category the activities were swimming and walking for exercise. A derived measure of frequency of participation was used which rated degree of involvement as either 'none or little participation', 'moderate participation' or 'regular participation'. The demographic variables of age and sex were also in the analysis. Five age categories were created to represent stages of the lifespan: adolescence (11 to 19 years of age), young adults (20-34), mid-life (35-49), pre-retirement (50-64) and older adults (65-80 years of age). Analyses assessed the simple relationship between psychological well-being and participation for each of the individual leisure activities and for sex and age. The moderating effects of sex and age were also investigated using factorial analysis of variance and multiple classification analysis (MCA).

Results showed a significant positive relationship between psychological well-being and participation in 'social activities' (visiting friends and involvement in social clubs) and one of the 'passive activities' (hobbies and crafts). However, neither of the physical activities (walking for exercise or swimming) showed a significant relationship to psychological well-being. Furthermore, with the exception of hobbies and crafts, the point in the lifespan appears to have no mediating effects on the relationship between leisure participation and psychological well-being. In conclusion, it seems that participation in passive and social leisure activities is related to psychological well-being for both males and females across the lifespan but that participation in physical activity is less strongly related. It is proposed that it is the inherent qualities of the activity rather than participation in itself which leads to benefits. The authors suggest that this results of this study may have been influenced by the nature of the physical activities investigated.

48. Statistics Canada (2001), National Longitudinal Survey of Children and Youth: Participation in activities, 1998/99. Statistics Canada. [online] Available www.statcan.ca/Daily/English/010530/d010530a.htm [May 2001].

Impact: development of life skills, social behaviour, self-esteem
Population: children, adolescents
Methodology: multivariate quantitative
Country: Canada

Author's abstract not provided

Additional comments

This report presents selected findings from the National Longitudinal Survey on Children and Youth (NLSCY), a national survey developed jointly by Human Resources Development Canada and Statistics Canada which aims to "monitor the development and well-being of Canada's children as they grow from infancy to adulthood". The bulk of the data presented relates to the 1998/99 cycle of the survey, the third phase of the collection, with selected data presented from previous phases conducted in 1994/95 and 1996/97. The NLSCY collects a range of information on factors considered to be related to children's growth and development including data on health, behaviour, school experiences, family characteristics and participation in activities.

The survey has been designed to provide longitudinal data, collecting information from a set sample of children from across Canada at regular (2 yearly) intervals. The children selected were aged from 0 to 11 years during the first collection phase (4 to 15 years at the time of the third collection phase). The final responding sample in 1994/95 was just under 23,000. For the second and third collection phases it was decided to reduce the size of the sample with the result that in 1996/97 and 1998/99 a total of 16,900 of the children from phase 1 were selected. The response rate in 1996/97 was 92% (the response rate for the 1998/99 phase is not reported). For the purposes of producing cross-sectional estimates an additional sample of children in age groups no longer covered by the longitudinal sample was included in phases 2 and 3. The longitudinal sample was selected via a cluster sample of households included in the Canadian Labour Force Survey, while the cross-sectional sample was selected from a register of births.

The NLSCY collects a wide range of information using a variety of instruments. Sociodemographic information and details of housing conditions, family status and neighbourhood characteristics were collected by interviewing the parents of children selected in the sample. In addition parents were asked questions about their own and their child's health (both physical and mental), education, and participation in out-of-school activities. The questionnaire also included questions designed to assess the quality of care and support available to each child and the child's temperament and behaviour including details of hyperactivity, aggression, anxiety and sociability. In addition, each child's teacher and school principal completed a series of questions relating to academic performance and classroom behaviour. A separate questionnaire was administered to children aged 10 years and over which collected information directly from the child about family and relationships, schooling and activities, as well as feelings, self esteem, risk taking and use of cigarettes, alcohol or drugs. Children in the 4-6 years age group were administered the Peabody Picture Vocabulary Test to assess receptive or hearing vocabulary, while children in grade 2 and over completed a mathematical and reading skills test based on the standardised Canadian Achievement Test.

This report focuses on analysis of results from the NLSCY to explore links between participation in organised out-of-school activities, such as sport, music, the arts and clubs, and self-esteem, educational performance and positive social behaviour. For both younger and older children a strong relationship was found between participation in organised activities and well-developed social skills, including the ability to interact effectively with others, develop effective social relationships and demonstrate compassion and understanding in dealing with others. Positive links were also found between participation in organised leisure activities and self esteem. Longitudinal analysis using results from the three survey phases showed that youth aged 12-15 who had never or rarely participated in sport were four times more likely to report low levels of self esteem than those who participated regularly. Children who participated in organised sports were also more likely to be satisfied with their appearance and weight and to rate their health as excellent or very good. In addition, youth who had rarely participated in organised sport were found to be almost three times more likely to smoke than those who participated regularly. Some association was also found between participation in organised leisure activities and academic performance amongst younger children.

As noted in the report, despite the identification of relationships between organised participation in leisure activities and positive self-esteem and well-developed social skills, causality cannot necessarily be assumed. While some longitudinal data is presented which may indicate a deterioration in specific variables when participation ceases, the bulk of the data presented in the report is of a correlational nature. No information is provided in relation to 'improvements' in specific characteristics over time as a result of commencing particular activities. The observed association between participation and positive characteristics may merely be a factor of broader relationships between, for example, socioeconomic status and self esteem. The article notes that children from lower income families were least likely to participate in organised activities. Another issue to consider is the relatively broad definition of 'leisure activity' used in this analysis and the resultant small size of the 'non-active' group.

49. Stein, P.N. & Motta, R.W. (1992) "Effects of Aerobic and Nonaerobic Exercise on Depression and Self-concept", Perceptual and Motor Skills, 74, 79-89.

Impact: mood, self-esteem
Population: college students
Methodology: multivariate quantitative
Country: USA

Authors' abstract

The effects of aerobic and nonaerobic exercise on depression and self-concept were investigated in a pre-test/post-test control group design. Eighty nine undergraduates engaged in the aerobic exercise of swimming, the nonaerobic exercise of weight training, or a control, Introductory Psychology class. Dependent measures were the Beck Depression Inventory, Depression Adjective Check Lists, Tennessee Self-concept Scale, and Cooper's 12 Minute Swim. Analysis indicated that both the aerobic and nonaerobic groups were equally effective in significantly reducing self-reported depression in comparison to the controls. The nonaerobic condition was superior to the aerobic condition for enhancing self-concept. These results contradict earlier findings suggesting that only aerobic types of exercise yield psychological benefit but are consistent with more recent findings showing the psychological benefits of nonaerobic exercise.

Additional comments

The sample used in this study consisted of college students who were enrolled in swimming, weight training or introductory psychology classes at a private university in Nassau County, New York. Of these, 98 qualified for inclusion in the study based on the criteria that they had not participated in any exercise training for at least 3 months prior to the commencement of the study did not participate in any additional exercise during the treatment period. The final sample used in analyses consisted of 89 students ranging in age from 18 to 42 years (mean age = 20 years). Testing of various demographic variables (age, height, weight, income and race) revealed no significant differences between the three groups (swimming, weight training, psychology), although there were more females than males enrolled in the swim group and vice versa in the weight training group.

An exercise history questionnaire was administered to all participants. Subjects in all three classes completed the Beck Depression Inventory, the Depression Adjective Check List and the Tennessee Self-Concept Scale at the beginning of the first class and again in the final class. Two 90 minute classes were held per week for a period of 7 weeks. An additional measure of aerobic capacity was assessed for the aerobic exercise group (swimming class). The aerobic group participated in swimming to increase their aerobic fitness levels. The weight-training (non-aerobic exercise) class involved structured Progressive Resistance Training Exercises (PRE) but no aerobic exercise. The lecture control class were instructed to refrain from participation in any exercise.

Analysis of covariance was used to examine the data obtained using pretest scores as the covariates. Results indicate that both the aerobic and non-aerobic groups demonstrated a statistically significant difference from the control group in terms of improvements in depression. The non-aerobic weights class demonstrated a statistically significant difference from the control group in terms of improvements in the overall measure of self-concept and the subscales of physical self, personal self and social self. The personal self subscale was the only statistically significant difference between the non-aerobic and aerobic classes, with

members of the non-aerobic class reporting greater improvements. It is concluded that both aerobic and non-aerobic exercise have a positive influence on psychological well-being and that as such the impact of exercise on psychological well-being is independent of improvements in fitness. The self-selected nature of this sample should be considered when interpreting these results.

50. Taub, D.E. & Blinde, E.M. (1992) "Eating Disorders Among Adolescent Female Athletes: Influence of Athletic Participation and Sport Team Membership", Adolescence, Vol. 27, No. 108, pp. 833-848.

Impact: personal well-being, self esteem
Population: female adolescents
Methodology: multivariate quantitative
Country: USA

Authors' abstract

Female athletes have been identified as a potential risk group for the development of eating disorders. Although adolescents in general are particularly vulnerable to the onset of eating disorders, little research has examined the problem among high school female athletes. The present study explored this population by comparing female athletes and non-athletes in terms of (a) behavioural and psychological traits associated with eating disorders and (b) use of pathogenic weight control techniques (laxatives, vomiting, fasting, and diet aids). Sport-by-sport comparisons were also investigated to determine if athletes in specific sports were more at risk. Moreover, in an attempt to link athletic participation and eating disordered behaviour, the gender-role orientation of athletes was examined. Results indicated that (a) athletes were more likely than non-athletes to possess certain behavioural and psychological correlates of eating disorders, (b) there were few differences among the various sport teams, and (c) gender-role orientation was generally not a critical variable. Although group comparisons yielded limited significant differences, athletes nevertheless reported traits associated with eating disorders as well as use of pathogenic weight control techniques. The unique contributions of the sport context and coaching practices exacerbating disordered eating are discussed.

Additional comments

The sample in this study consisted of 100 female athletes (mean age =16.2 years) and 112 female non-athletes (mean age = 15.9 years) who were in grades 9 to 12 in a city high school. Both athletes and non-athletes were recruited from physical education classes. Other athletes at the school who were not in these classes were also asked to participate. Athletes were members of volleyball, basketball, track/cross-country, tennis and softball teams.

A questionnaire containing four sections was distributed during physical education classes. The questionnaire assessed the behavioural/psychological traits associated with eating disorders using the Eating Disorder Inventory (EDI), the frequency of pathogenic weight control behaviours (such as laxatives, vomiting, fasting), demographic information (age, race, grade level and athletic status), current dieting behaviour and gender-role orientation (using the Personality Research Form (PRF) ANDRO Scale). The differences between athletes and non-athletes on the 8 subscales of the EDI (drive for thinness, bulimia, body dissatisfaction, ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears) were investigated with t-tests. Similar analyses investigated the athlete/non-athlete differences in the self-esteem measure taken from the PRF ANDRO scale, the frequencies of pathogenic weight control behaviours and current dieting behaviours. Scheffe's method of multiple comparisons was used to assess whether these differences varied by race and grade level. The differences between athletes and non-athletes on the gender role orientation measures of masculine, feminine, androgynous and indeterminate were investigated with chi square analysis. Analysis of Variance assessed the interaction of gender-role orientation in the relationship between athletic participation and the other measures. Analyses were also

conducted for the purpose of comparing athletes in different sports.

It was concluded that female athletes were no more at risk of possessing or developing eating disorders than non-athletes. While statistically significant differences between athletes and non-athletes on the perfectionism and bulimia scales of the EDI were observed, athletes demonstrated higher self-esteem than non-athletes which runs counter to the eating disorder profile. Despite the conclusion that athletes are no more susceptible to eating disorders, several individual athletes demonstrated elevated scores for a number of the EDI scales suggesting that some athletes may be more vulnerable. No statistically significant differences between the sporting teams were obtained.

51. Thayer, R.E., Peters D.P. III, Takahashi, P.J. & Birkhead-Flight, A.M. (1993)
"Mood and Behavior (Smoking and Sugar Snacking) Following Moderate Exercise: A Partial Test of Self-Regulation Theory", Personality and Individual Differences, Vol. 14, No. 1, pp. 97-104.

Impact: social behaviour, personal well-being, mood
Population: smokers, frequent sugar snackers
Methodology: multivariate quantitative
Country: USA

Authors' abstract

To study the effect of moderate exercise on self-rated mood and other behaviors, 5-minute brisk walks were taken by smokers before a desired cigarette (Experiment 1; $N = 16$), or by frequent snackers before a sugar snack (Experiment 2; $N = 18$) on multiple occasions over 3-week periods. Self-ratings before and after exercise indicated that walks produced increased energy and reduced urge to smoke or snack. Also, the walks approximately doubled the time before smoking the next cigarette, or eating the next snack in free smoking and snacking conditions. This research provides some evidence for a self-regulation of mood model in which moderate exercise may sometimes be substituted for smoking or snacking on the basis of common mood effects.

Additional comments

Two experiments were included in this study. Both experiments were designed to examine the theory that moderate exercise would result in increased energy levels and reduced tension, and the impact of moderate exercise on cigarette (experiment 1) and sugar urges (experiment 2). The first experiment included a sample of 5 male and 11 female smokers who were aged between 18 and 44 years. The sample in the second study consisted of 7 male and 11 females aged between 18 and 52 years who were frequent sugar snackers. All subjects volunteered to participate in these experiments and were unfamiliar with the research hypotheses.

In both experiments self-reported measures of energy and tension levels were assessed by a Short Form AD ACL measure of momentary mood states. A rating of the present urge to smoke or snack was measured on a scale from "extreme" urge to "none at all". On 12 occasions subjects partook in 45 minutes of sedentary activity before reporting initial measures of mood and cigarette/sugar urges. Participants were then informed whether they were to go for a brisk 5 minute walk or continue sedentary activities for a further 5 minutes. These instructions were randomly distributed across the 12 sessions for each individual. Following the 5 minute intervention, subjects were asked to complete measures of mood and urges a second time and were then free to smoke or snack as they pleased. They were also asked to note the time that they smoked their first cigarette/ate their first sugar snack following treatment. Repeated measures ANOVAs were used to examine the effects of exercise on mood and urges to smoke and snack.

Walking was found to significantly reduce the ratings for urge to smoke and urge to snack. The time until the next cigarette or sugar snack was also significantly greater following the brisk walk than the sedentary activities. Results for both experiments demonstrate increases in self-reported levels of energy following walking, however, the results for the tension subscale differed between the two experiments. While walking did not produce the expected decline in subjective tension levels for the cigarette smoking experiment, a reduction in tension following the walk was evident in the sugar-snacking experiment. From these results

the authors theorise that increasing subjective energy may be the intervening factor in the relationship between exercise and behaviour. However, a causal relationship between exercise, mood and reduction in smoking and snacking behaviours can not necessarily be concluded from this correlational research. It is also unclear how closely supervised subjects were during the experimental occasions. The nature of the experiment and the subsequent quality of the data collected rely strongly on close supervision of participants and this should be a considering factor when evaluating these findings.

52. Thirlaway, K. and Benton, D. (1992), "Participation in Physical Activity and Cardiovascular Fitness Have Different Effects on Mental Health and Mood", Journal of Psychosomatic Research, Vol. 36, No. 7, pp 657-665.

Impact: personal well-being, mood
Population: adults
Methodology: multivariate quantitative
Country: UK

Authors' abstract

The cardiovascular fitness, blood pressure, resting pulse, lung capacity and body fat of 2465 subjects were measured and each subject completed activity, mental health and mood questionnaires. The results of this study support the hypothesis that participation in physical activity, rather than cardiovascular fitness, is the factor associated with better mental health and mood. Higher levels of physical activity were associated with better mood scores unless the individuals were unfit. This research has implications for how physical activity is prescribed; the emphasis needs to be on performing physical activity rather than improving fitness and should not be beyond the physical capabilities of the individual.

Additional comments

A total of 246 participants were included in the sample for this study. Of these, 208 were employees of the West Glamorgan County Council who responded to a staff bulletin advertising a free fitness test with the completion of three questionnaires. The remaining 38 participants had already booked fitness tests at the Swansea Leisure Centre. The sample included 155 males and 91 females aged between 18 and 63 years old.

A physical activity habits questionnaire obtained information relating to the type of activities and level of participation. Based on these responses a derived measure of overall activity level was formulated and subjects were classified into one of three groups: none to virtually no activity, some activity and active. Physiological measures including a sub-maximal test of VO_2 max on a bicycle ergometer were conducted to classify participants into four fitness groups depending on their age and sex: low, somewhat low, average and high. Mental health was assessed by the General Health Questionnaire while the Profile of Mood States provided a measure of mood. Correlational analyses investigated the relationships between the physiological variables and activity scores. As age did not appear to be involved in the relations between variables a three way analysis of variance (activity level x sex x fitness level) was used to analyse the mental health and mood data.

Results indicated that those who reported higher levels of physical activity tended to rate better in terms of mental health (as measured by the General Health Questionnaire), regardless of age, sex or fitness levels. Thus, it is proposed that activity is associated with mental health while fitness is not. However, there was an interaction between level of activity and fitness for the Profile of Mood States such that mood and activity levels were only related for the somewhat low, average and high fitness groups but not for the low fitness group. The authors therefore conclude that benefits of activity on mood may be lost when the level of exercise becomes too demanding for the individual concerned. It should be noted that due to the correlational nature of this study a causal relationship between activity and mental health cannot necessarily be assumed. In addition, socioeconomic similarities between the participants, as a result of the majority being from the same workplace, may limit the generalisability of the results.

53. Vilhjalmsson, R. and Thorlindsson, T. (1992) "The Integrative and Physiological Effects of Sport Participation: A Study of Adolescents", The Sociological Quarterly, Vol. 33, No. 4, pp 637-647.

Impact: mood, social behaviour
Population: adolescents
Methodology: multivariate quantitative
Country: other (Iceland)

Authors' abstract

The integrative and physiological effects of sport participation are investigated using data from a national survey of Icelandic adolescents. Focusing on mental health and health related behaviour, the study shows more benefit from club sport than informal group sport, and, in turn, individual sport. As the physiological perspective suggests, beneficial effects are largely due to strenuousness of exercise. However, findings also suggest that club sport has an integrative effect when predicting positive aspects of mental health, an effect limited to urban communities, as comports with social integration theory.

Additional comments

The analysis conducted is based on data from the Icelandic component of the WHO-Euro cross national collaborative study on the health behaviour of schoolchildren. The study population was randomly selected from a complete list of Icelandic adolescents and includes 1200 males and females aged between 15 and 16 years. In this sample, 41% reported that they were involved in club sport while 73% reported that they participated in non-club sport (with considerable overlap).

Four dimensions of mental health were included as dependent variables. Life satisfaction was measured with a single 4 point scale ranging from 0 (unsatisfied) to 3 (very satisfied). Three items relating to anxiety measured how often subjects felt anxious, tense and restless, or had problems concentrating. Similarly, four items assessed depression levels by asking how often participants felt sad or blue, were lonely, felt tired when they hadn't exerted themselves and had sleeping problems. The frequencies of psychophysiological symptoms such as headache, stomach pains and dizziness were also assessed. In addition, subjects were asked about their levels of smoking and alcohol consumption. Respondents were asked to indicate whether they participated in club sport, other group sport or other individual sport and how often they participated in these as well as the strenuousness of the exercise they engaged in. Strenuousness was assessed based on the frequency and duration of involvement. Sex, social class (determined by the parents' occupational groups), residence and details of existing medical conditions were collected to be used as control variables. Data was analysed using correlational and multiple regression analyses.

Results indicate that participation in club and group sport was positively related to life satisfaction and negatively related to anxiety, depression, psychophysiological symptoms, smoking and alcohol use, even when the effects of the sociodemographic variables and medical condition were controlled. It was found that participation in individual sport was unrelated to any of these factors. However, when differences in exercise intensity (strenuousness) between organised and individual sport are taken into account there appeared to be little difference in the degree of benefit derived from each. The authors therefore theorise that the apparent benefits associated with club/group sport versus individual sport may simply reflect increasing levels of exercise intensity (strenuousness) as the level of

organisation increases and subsequently concluded that the beneficial effects of sports participation are largely due to the positive consequences of strenuous physical activity. Given that this study makes use of cross-sectional data it should be noted that despite observed relationships between mental health factors and sports participation, these results do not provide definite causal evidence.

54. Vuori, I., Fentem, P., Svoboda, B., Patriksson, G., Andreff, W. & Weber, W. (1995)
The Significance of Sport for Society - Health, Socialisation, Economy. Council of Europe.

Impact: social behaviour, development of life skills
Population: children, adults, aged, general population
Methodology: literature review
Country: Various European nations, USA

Authors' abstract not provided

Additional comments

This report discusses current theory and evidence of the contribution of sport to society. It consists of 3 main sections which discuss the impact of sport on health, socialisation and economy. While largely a theoretical discussion, a range of findings are presented from a variety of studies dating mainly from the 1980s and early 1990s.

It is argued that the nature of sports participation has broadened over time, now involving a wide range of social groups, and associated with a wide range of individual and group aims. Consequently, it is claimed that sport is now an important aspect of a society's quality of life and culture.

Based on discussion of socialisation theory and the evidence provided by research, the authors conclude that sport is an important aspect in socialisation - the process by which individuals "learn the skills, attitudes, values and behaviours that enable them to participate as members of the society in which they live". This is achieved both through the promotion of social skills and individual 'benefits' such as the development of positive attitudes and coping strategies for dealing with mental health problems. It is argued that sport can be particularly effective from a socialisation perspective for children, however evidence is also presented of the potential benefits for adults, older persons, and members of 'special needs groups' such as youth-at-risk and person with disabilities.

It is conceded that the effectiveness of sport as an aspect of socialisation with sport may be dependent on the effective organisation and management of sporting activities.

The authors acknowledge that socialisation is an extremely difficult concept to measure and sport is but one of many individual and external factors which may impact on this. The methodological limitations of previous studies are also recognised, in particular the prevalence of cross-sectional research which incorporates testing only at one point in time. The validity of directly comparing athletes and non-athletes in studies of socialisation is also questioned and the point is made that individuals with particular traits may in fact be more likely to play sport rather than such traits being shaped by participation. As a result of these factors there is a lack of casual evidence linking participation and socialisation.

55. Wankel, L.M. and Berger, B.G. (1990) "The Psychological and Social Benefits of Sport and Physical Activity", Journal of Leisure Research, Vol. 22, No. 2, pp. 167-182.

Impact: mood, social cohesion, social behaviour
Population: general population
Methodology: literature review
Country: Canada, USA

Authors' abstract

Csikszentmihalyi's (1982) model of sport values is used as a framework for examining the benefits of sport. An overview is given of the research evidence pertaining to the contribution of sport and physical activity to personal enjoyment, personal growth, social integration and social change. In all four areas, there is seen to be a potential for significant positive contributions; however, there is also a potential for negative outcomes. The critical feature then becomes identifying the prerequisite activity, leadership, organisational and environmental conditions for facilitating positive outcomes. A number of recommendations for future research directions are made with respect to the different outcome areas.

Additional comments

This paper discusses the benefits of sport and physical activity in relation to the sports value model proposed by Csikszentmihalyi (1982). This model defines four main consequences of participation: personal enjoyment, personal growth, social harmony/integration, and social growth/change. The authors investigate the evidence supporting benefits in these areas, considering research dating mainly from the mid to late 1980s.

Some support is found for the notion that exercise is associated with both reduced levels of anxiety and, to a lesser extent, depression. However, it is noted that a causal relationship has yet to be established and that several studies have found no relationship between participation and these variables. While some studies have found that even low levels of exercise intensity are associated with positive benefits and, in some cases, that high levels of intensity may in fact have a negative effect on psychological variables, the authors note the lack of reliable evidence investigating which types of exercise are most likely to be effective.

Evidence supporting the ability of sport to act as a moderator of social behaviour and as an agent of broader social change is inconclusive. Much previous research is of an anecdotal nature or is based on self-report measures, and the lack of longitudinal data is acknowledged.

Additional research by Wankel (1993) discusses the role of mediating factors, in particular enjoyment, on exercise adherence and motivation.

56. Wankel, L.M. & Sefton, J.M. "Physical Activity and Other Lifestyle Behaviors" pp. 530-550. In Bouchard, C., Shephard, R., & Stephens, T. (1994), "Physical Activity, Fitness and Health", International Proceedings and Consensus Statement. Champaign, IL: Human Kinetics.

Impact: social behaviour, personal well-being
Population: general population, smokers, drinkers
Methodology: literature review
Country: USA, Canada

Authors' abstract not provided

Additional comments

This paper reviews a number of articles published since the mid 1980s which examine the relationship between physical activity participation and other lifestyle behaviours, including smoking, diet and alcohol consumption.

The authors find some evidence of a negative association between physical activity participation and smoking, however a significant number of the studies reviewed found no association between these factors. In addition there is some evidence that as exercise intensity increases, tobacco consumption declines. Little research has been done on the use of physical activity as strategy in smoking cessation programs. The majority of the studies reviewed showed no links between physical activity participation and alcohol consumption.

The authors conclude that the literature reviewed provides only very limited evidence that undertaking a physical activity program will result in improvements in other lifestyle behaviours.

The methodological limitations and correlational nature of many of the studies reviewed in this article should be noted. It is acknowledged that the development of lifestyle behaviours is a complex process which can not necessarily be explained by single factors.

57. West, S.T. & Crompton, J.L. (1999) Do Outdoor Adventure Programs Alleviate Negative Behavior Among At-Risk Youth? A Review of the Empirical Literature. [online] Available www.rpts.tamu.edu/witt/conpubs/crompt.pdf [November 2000].

Impact: crime prevention, self esteem
Population: youth-at-risk
Methodology: literature review
Country: USA

Authors' abstract

Outdoor adventure programs are a form of experiential learning that advocates believe positively impacts at-risk youth. These programs have been part of the renaissance of interest that has occurred over the past decade in the use of recreation programs for the instrumental purpose of alleviating negative behaviour in youth. After describing the characteristics of these programs and their perceived benefits, the paper reviews empirical findings reported in the literature which have evaluated whether the instrumental goals are attained. The research falls into two categories: studies that measure the recidivism rates of juvenile delinquents, and those that assess the psychological benefits of participation.

The results from studies evaluating recidivism rates were generally positive, with eight out of thirteen studies reporting rates of recidivism in their experimental groups. Thirteen out of fourteen studies investigating changes in the self-concept of participants also reported significant positive changes. The cumulative consistency of the findings adds credence to the notion that outdoor adventure programs can contribute to alleviating negative behaviors among youth.

However, this support can only be tentative because an analysis of the individual studies' designs indicated that the internal validity of a majority of them was suspect. Other factors contributing to the tentativeness of the support included the different operationalizations used for recidivism and self-concept; a tendency to develop hypotheses ex post facto instead of a priori; and the myopic focus on self-concept rather than measuring the impact on multiple protective factors.

Additional comments

This article reviews 27 studies dating from the 1960s through to the 1990s which investigate the effectiveness of specific outdoor adventure programs as a means of rehabilitating delinquent youth. Approximately half of the studies reviewed focus on associations between program participation and reductions in recidivism rates, while the remainder examine the relationship between participation and enhanced self-esteem.

The majority of the research reviewed supports the notion that outdoor adventure programs can be effective as a means of rehabilitating delinquent youth. Significant treatment effects were noted in the case of both reduced recidivism rates and enhanced self-esteem. However it should be noted that a small number of studies found associations between participation in wilderness programs and higher levels of recidivism.

The internal validity of these studies is assessed based on the guidelines developed by Campbell and Stanley (1963). The authors concede that many of the studies reviewed suffer from methodological limitations. These include lack of appropriate control conditions, non-random allocation of treatment samples, lack of pre-testing and small sample sizes.

The authors acknowledge that the assumption of a link between enhanced self-esteem and reduced levels of recidivism may be somewhat simplistic given the range of other factors which may potentially impact on the likelihood of a juvenile re-offending.

It is concluded that further research adopting sound methodological principles is required, particularly to investigate whether the short term benefits associated with many of these programs are maintained over the longer term.

58. White, S. (1995) "The Perceived Purposes of Sport Among Male and Female Intercollegiate and Recreational Sport Participants", International Journal of Sport Psychology, Vol. 26, pp. 490-502.

Impact:	development of life skills, self-esteem
Population:	college athletes
Methodology:	qualitative
Country:	USA

Author's abstract

Sport research has indicated that individuals possess different views about the overall purposes of participating in physical activities. The existence of individual differences in the perceived purposes of sport have yet to be investigated with athletes at the intercollegiate and recreational sport levels. Therefore, the purpose of this study was to determine the relationship between the perceived purposes of sport in male and female intercollegiate and recreational sport participants. One hundred and thirty three intercollegiate athletes and seventy nine recreational sport participants completed the Perceived Purpose of Sport Questionnaire (Duda, 1989*b*). Results suggested that female recreational participants, more than intercollegiate males and females and recreational males, perceived the purposes of sport as developing personal mastery and cooperation, a means of forming healthy lifestyle habits, and cultivating positive attitudes toward society. Intercollegiate males, in contrast to all other groups, viewed sport as an agent to further career opportunities and heighten social status. A gender difference emerged with males viewing the purposes of sport as an arena for competition, and materialistic and individualistic gains more than females. The ratings on Competitiveness, High Status Career, Physically Active Lifestyle, and Good Citizen were also significantly different as a function of level of sport involvement. Specifically, intercollegiate athletes believed sport should make them competitive and provide more career opportunities. Recreational participants, on the other hand, thought sport should decrease health risk behaviors and advance societal values and morals.

Additional comments

The sample included in this study was 212 sport participants from the north-east region of the United States. This sample consisted of 74 male intercollegiate athletes (mean age of 20.7), 59 female intercollegiate athletes (mean age of 20.3), 41 male recreational athletes (mean age of 21.7) and 38 female recreational athletes (mean age of 21.1). The intercollegiate athletes were members of NCAA division I teams in the sports of ice-hockey, field hockey, lacrosse, swimming, basketball and baseball. The recreational athletes, on the other hand, were members of intramural teams (not involved in leagues) in sports such as soccer, volleyball, basketball, tag-football and aerobics. All subjects volunteered to take part in the study.

The main measure in this study was the Perceived Purpose of Sport Questionnaire (PPSQ) which was developed from previous studies. The questionnaire was administered to each participant 40 minutes before a game or at the beginning of the activity session and asked subject about the perceived benefits of the sport in which they were participating. A Gender by Level of Sport Involvement (2 x 2) MANOVA was conducted with the seven subscales of the PPSQ as the dependent variables (Mastery/Cooperation, Physically Active Lifestyle, Good Citizen, Competitiveness, High Status Career, Enhanced Self-Esteem, and Enhanced Social Status). Univariate F tests and Post Hoc (Scheffe) analyses were also conducted to investigate gender and level of sport involvement differences for each of the subscales.

Results suggested that the perceived purposes of sport vary as a function of gender and level of sport involvement. For example, while recreational females perceived that sport should enhance skill mastery and aspects of self-improvement, intercollegiate males perceived that sport should enhance their career opportunities and social status. The authors acknowledge the need for further research in this area and note that the questionnaire used in this study may not be sufficient to measure the range of benefits which may be derived from sport. It should also be noted that the questionnaire asked subjects about the purpose of sport rather than focusing on the individual benefits that subjects themselves may have experienced. It is therefore possible that subject's responses may merely reflect common conceptions about what benefits participation *should* provide rather than focusing on actual individual results.

59. Willox, M. (1994) 'The Benefits of Sport', Saskatchewan Parks and Recreation Association Inc. [online] Available www.lin.ca/lin/resource/html/mo51.htm [January 2001].

Impact: personal well-being, mood, self esteem, social behaviour, social cohesion
Population: children, adolescents, adults, aged
Methodology: literature review
Country: Canada

Author's abstract not provided

Additional comments

This paper presents a collection of 'benefit' statements from a range of articles, dating mainly from the late 1980s and early 1990s. These statements are categorised under the broad headings of 'benefits of sport for children and youth'; 'benefits of sport for adults'; 'benefits of sport for older adults'; and 'benefits of sport through economic impact'. Those categories focusing on the social impacts of sport are further split into sub-categories relating to physical, mental and social health.

The overall picture presented is very positive with a range of benefits identified for each of the subcategories, particularly in the areas of physical and mental health. However, the statements presented are brief and largely of a general nature, with only a minimal focus on the presentation of statistical data. Little consideration appears to have been given to methodological factors associated with the studies quoted and no attempt has been made to evaluate the findings presented.

60. Wright, P., Harwell, R. & Allen, L. (1998) "Programs that Work: Project Stride, A Unique Summer Intervention Program for Youth-At-Risk", Journal of Park and Recreation Administration, Vol. 16, No. 1, pp. 97-113.

Impact: development of life skills, self-esteem
Population: youth-at-risk in rural areas
Methodology: program evaluation, descriptive quantitative, qualitative
Country: USA

Executive summary

Research has indicated that healthy self-perceptions are positively correlated to resiliency. Recreation programs have been suggested to provide the necessary tools for fostering positive self-perceptions among children. Project STRIDE was initiated under the auspices of a benefits-based management delivery system. This innovative prescriptive recreation program targeted at-risk youth in a rural community in South Carolina. The program consisted of eight elements: activity processing; problem solving; journal keeping; motivational speakers; sports clinics and aquatics programs; program ownership; original experiences; and awards and opportunities for positive recognition. The purpose of the study was to determine whether a prescriptive benefits-based summer recreation program could facilitate the development of positive self-perceptions related to academics, athletics, social skills, personal appearance, behavioural conduct and global self-worth. The actual experiences that STRIDE participants were exposed to were aimed specifically at enhancing self-perceptions in each of the six domains. Each program was structured to target different cognitive and affective aspects of the participant's lives. In the analysis, the Project STRIDE group (n = 28) was compared to a control group (n = 16). Results of the analyses showed STRIDE participants to have experienced significantly increased self-perceptions compared to the other groups on the subscales of scholastic competence, social competence, athletic competence, and personal appearance. The study indicated that positive recreation experiences, that are largely prescriptive in nature, can have a significant impact on children's self-perceptions. Through the development of a positive self-image, children can foster and strengthen those (resiliency)skills necessary to become productive members of society. Project STRIDE offers a refreshing approach to providing meaningful recreational and educational opportunities in the non-school hours. Rural communities in particular have a distinct need for summer programs that can provide youth with activities that are challenging and enriching. Recreation should no longer be considered as purely a diversionary pursuit, but should be accepted for its tremendous catalytic potential for building resiliency. These so called "at-risk" youth have a tremendous surplus of energy, but have greater need for recognition and opportunities to achieve success. Recreation can provide a medium whereby this surplus energy can be deployed constructively rather than destructively. Future research efforts should be encouraged to emphasise both quantitative and qualitative evaluation methodologies to help provide a more accurate picture of the true nature of the recreation experience.

Additional comments

The sample in this study included 70 fourth and fifth graders (aged between 10 and 12 years) at an elementary school in a rural community in South Carolina. Twenty-eight (18 males, 10 females) participated in Project STRIDE (Success Through Recreation in Disadvantaged Environments), 16 (10 males, 6 females) participated in a traditional summer recreation program administered through the South Carolina Rural Recreation Project and a further 26 (10 males, 16 females) comprised a control group who participated in no organised recreation

during the summer months. The participants in Project STRIDE were selected by the school principal, counsellors and teachers based on behavioural problems and "at risk" characteristics. Participation in the traditional program was entirely voluntary.

Project STRIDE was a 9 week program that involved participation in up to 5 hours of physical activity on 6 days per week. A number of different sports/activities such as tennis, aquatics, track and field, adventure recreation and soccer were included in the program with the focus on a different activity each week. This program also included an educational component which aimed to develop skills and attitudes in academic, physical, social and behavioural areas. Eight key program components were incorporated into the recreation program: activity processing, problem solving, journal keeping, motivational speakers, sports clinics and aquatics programs, program ownership, original experiences and awards/opportunities for positive recognition. The South Carolina project on the other hand was a traditional day camp which focussed on fun and was entirely recreation based. It included participation in games, sports, field trips and arts/crafts activities.

Harter's Self Perception Profile was administered prior to commencement of the summer programs and again two weeks after the programs were completed. It included six subscales: Scholastic competence, Social competence, Athletic competence, Personal appearance, Behavioural conduct and Global self-worth. In addition, qualitative data was obtained from participant's journals, focus group interviews (with parents, teachers and participants) and program leaders' field notes. Analyses of covariance using pretest scores as covariates were performed for the self-perception data.

The results of this study indicated that improvements in positive self-perceptions were greater for the Project STRIDE participants than the other two groups. Statistically significant differences between the Project STRIDE group and both the traditional program and control groups were obtained for the subscales of Scholastic competence, Social competence and Athletic competence. There was a significant difference between the STRIDE and traditional group in terms of the Personal appearance subscale. Differences on the Behavioural conduct and Global self-worth subscales were not significant. In addition, control subjects improved to a greater extent on social and athletic competencies than participants in the traditional day camp. These results suggest that the benefits obtained from a recreation program incorporating educational elements are greater than those obtained from a traditional day camp, however inherent differences in the characteristics of the participants involved in these programs should be considered. The Project STRIDE group consisted solely of children identified as "at risk" while the control group and traditional programs included other fourth and fifth graders.

61. Yeung, R.R. (1996) "The Acute Effects of Exercise on Mood State" Journal of Psychosomatic Research, Vol. 40, No. 2, pp. 123-141.

Impact: mood
Population: general population
Methodology: literature review
Country: UK, USA

Author's abstract

This paper documents the recent (1976-1995) literature on the acute mood effects associated with participation in single sessions of exercise. Issues regarding experimental design, 'ecological validity' and the operational definition of mood are addressed. Results from these studies suggest that both clinical and non-clinical subjects may benefit acutely from even a single bout of exercise. Finally, possible mechanisms and recommendations for future research are discussed.

Additional comments

This paper is a comprehensive review of 81 studies published between 1976 and 1995 which investigate the effects of a single session of exercise on mood. The studies are classified as either 'quasi-experimental' (no control group, lack of random selection), 'pre-experimental' (no control group) or 'true experimental'. Only 23 of the studies reviewed are classed as true experimental.

The majority of the studies reviewed show associations between a single session of exercise and improved mood, however, as noted by the author, the methodological limitations evident in many of the studies should be considered. The limitations mentioned include over-reliance on student samples, questionable control conditions and small sample sizes. The author also expresses concern regarding the mood assessment tools utilised in these studies, claiming that many are skewed toward measuring improvements in negative mood rather than the presence of positive mood. Discussion of the 'distraction hypothesis', where it is theorised that it is respite from daily life provided by the activity rather than the nature of the activity itself which results in positive outcomes, and the 'mastery hypothesis', which concludes that improvements in mood result from feelings of achievement, is also presented.

The lack of research investigating the impact on mood of exercise of varying duration and intensities is noted and the author recommends that future research focus on these aspects.

62. Zhang, J.J., Pease, D.G. & Hui, S.C. (1996) "Value Dimensions of Professional Sport as Viewed by Spectators", *Journal of Sport and Social Issues*, Vol. 20, No. 1, pp. 78-94.

Impact: community pride/identity, social cohesion, social behaviour
Population: spectators
Methodology: descriptive quantitative
Country: USA

Authors' abstract

This study examined the value dimensions of professional sport to the community as perceived by the spectators. Three stages were conducted; (a) formulation of the Community Impact scale (CIS), (b) test of measurement properties, and (c) application of the scale. The initial scale was formulated by identifying 70 value areas of professional sport through a literature review. Each was phrased into bipolar statements using a blend of semantic differential and Likert-type 5-point scales. Five professors tested the content validity. A random sample of professional sport spectators (N = 224) participated in testing and applying the scale. Construct validity was tested through a factor analysis. Eight factors with 45 items were determined. The resolved scale displayed acceptable internal consistency. An application of the CIS revealed that 5 demographic variables (age, socioeconomic status, ethnicity, education, and occupation) affect the perceptions of spectators on the community value of professional sport.

Additional comments

A random sample of 224 sports spectators (130 males, 94 women) ranging in age from 15 to 70 years (mean age = 32 years) were included in this study. Participants were recruited from 6 home games of a professional basketball team in a major southern US city between 1993 and 1994.

One hundred surveys were administered to randomly selected sections within the stadium, 15 to 30 minutes before each of the six regular season home games. The questionnaires included the specially developed Community Impact Scale (CIS) which was designed to measure the various ways in which professional sports are of value to the community. Respondents were asked to rate the value of all professional sports, not just basketball. In addition, demographic variables (gender, age, family size, family annual income, marital status, education, ethnicity, occupation) and questions referring to the frequency of attending different professional sport competitions within the last 12 months were also included. Although 50-60% of surveys were returned at each of the six games, only 37 forms (on average) met the criteria for inclusion in data analysis (more than 10% of items completed). Construct validity of the CIS was tested through factor analysis using varimax rotation. This identified 8 "value" categories (Community Solidarity, Public Behaviour, Pastime Ecstasy, Excellence Pursuit, Social Equity, Health Awareness, Individual Quality and Business Opportunity) and 45 items which were included in the final scale used in analyses. Normative means and standard deviations were calculated for each factor to enable comparisons between the variables. Correlational analyses and Analysis of Variance were also conducted to test the relation between the demographic variables and the CIS factors.

The results of this study identified Community Solidarity and Public Behaviours as the strongest value dimensions of professional sport. However spectators' perceptions of the benefits of professional sport, as measured by the Community Impact Scale, are strongly related to their sociodemographic characteristics. Statistically significant correlations were

observed for age and the subscales of 'community solidarity', 'social equity' and 'health awareness' indicating that older people tended to have more negative views on the value of professional sport in these areas. Similarly, significant negative correlations were observed for socioeconomic status and 'excellence pursuit', 'social equity', 'health awareness' and 'individual quality' indicating that spectators of higher socioeconomic status were more pessimistic about the impact of sport. Differences in the perceived impacts of sport on 'pastime ecstasy', 'excellence pursuit' and 'social equity' between ethnic groups, educational levels and occupations were also found to be statistically significant. Spectators' gender and marital status appeared to be unrelated to their perceptions. It is acknowledged that the 37% completion rate of surveys, and the associated possibility that the responses of non-respondents may have been significantly different from those that responded, may limit the conclusions that can be drawn from this survey. Also, the relatively narrow nature of the sample (spectators attending the games of one team) further limits the generalisability of these results.

63. Zuzanek, J. & Mannell, R. (1998) "Life-Cycle Squeeze, Time Pressure, Daily Stress, and Leisure Participation: A Canadian Perspective", Society and Leisure, Vol. 21, No. 2, pp. 513-544.

Impact: personal well-being, mood
Population: adults
Methodology: multivariate quantitative
Country: Canada

Authors' abstract

This article addresses two corollary issues, namely, the relationship between life-cycle and chronic stress, and the effects of leisure participation on stress and health, controlled for life-cycle situation. Arguments have been made that levels of time pressure and perceived stress have risen in modern societies, but that these increases are unevenly distributed among different social demographic groups, in particular groups positioned at different stages of the life-course (Wilensky, 1981; Zuzanek, Robinson and Iwasaki, 1998). It has been also suggested that active life-styles, in particular participation in leisure activities, may serve as an effective tool for moderating negative health effects of stress. In the following analyses these two propositions are put to an empirical test. Data on stress, time pressure, health, and leisure participation, collected as part of the 1994 Canadian National Population Health Survey (n = 17,626), and the 1992 General Social (Time-Use) Survey (n = 9,185) are examined in an attempt to: (a) identify life-cycle groups most exposed to chronic and personal stress; (b) establish the relationship between daily stresses and time pressure; (c) assess the effects of participation in physically active leisure on respondents' stress levels and mental and physical health; and (d) determine how the relationships between life cycle, time pressure, daily stress, health, and leisure participation are affected by gender.

Additional comments

Data collected from both the 1994 Canadian National Population Health Survey (NPHS) and the 1992 General Social Survey (GSS) were used in this study. The sample for the NPHS consisted of 17,626 household residents aged 12 years and over from all provinces of Canada. The sample for the GSS included 9,815 persons aged 15 years and older.

The variables investigated in this study were life-cycle, stress, health, leisure participation, time use and time pressure. 'Life-cycle' was a derived variable based on age, marital status, employment status, and presence and age of children. Stress was defined in terms of the NPHA measures of 'chronic stress' (a composite measure incorporating subscales associated with financial problems, living and housing conditions, family health problems, relationship problems between partners and child-related problems) and 'personal stress' (a composite measure incorporating 5 items associated with role conflicts, e.g. "Is too much expected from you by others?"). Health was investigated in terms of both mental health (measured as the combination of distress, depression and emotional/cognitive well-being), and physical health (measured by objective health attributes and a self-assessment). 'Leisure participation' referred to the frequency of participation in 20 physically active leisure activities (e.g. walking for exercise, garden or yard work, swimming) during the past 3 months, as assessed by the 1994 NPHS. Measures of participation in social/cultural activities were obtained from the GSS. 'Time use' information was also taken from the GSS data and was used to form a combined measure of "time squeeze" which assessed the combined load of paid and unpaid work. One-way analysis of variance and structural equation modelling techniques were used to examine the relationships between variables.

Preliminary analysis focuses on investigating differences in stress patterns between the various life cycle groups, particularly in relation to the degree of "time squeeze" being experienced. Subsequently, the relationships between stress, mental and physical health and leisure participation within specific life cycle groups are analysed. It was found that participation in physically active leisure may contribute to physical health, but these benefits were only evident in life-cycle groups with low stress levels (e.g. retirees) and not for those experiencing the greatest stress (e.g. employed mothers). No direct link between physical activity participation and mental health was found for any of the life-cycle groups specified. It is therefore concluded that the stress buffering effect of leisure participation is not supported by this study. It is acknowledged that some of the inferences in this study should be viewed with caution as they refer to data collected from two different surveys.

5. Index

For each of the social impacts described in section 2, the following references are of relevance. References in the Australian and New Zealand category (section 3) are denoted by Roman numerals, while all other references refer to articles in the International category (section 4).

Community Pride/Identity	iv, xi, xvii, xxii, xxiii and 1, 7, 10, 26 ,29, 62
Crime Prevention	i, iii, iv, xi, xiii, xxii, xxiii, and 10, 11, 14, 26, 31, 35, 42, 57
Development of Life Skills	x, xx, and 6, 8, 10, 11, 14, 15, 17-19, 22, 26, 29, 31, 37, 40, 46, 48, 54, 58, 60
Mood	ii, v, viii, xi, xiv, xv, xvi, xix, xxi, xxiv, and 2-5, 7-10, 13, 16, 18, 20-22, 27, 28, 30, 32-36, 39, 41, 42, 44, 45, 47, 49, 51-53, 55, 59, 61, 63
Personal Well-Being	iv, v, viii, xi, xv, xvi, xviii, xix, xxiv, and 5, 9-13, 16-19, 21, 23-25, 27, 29, 30, 32, 33, 35, 39, 42, 45, 47, 50-52, 56, 59, 63
Self-Esteem	vi, vii, xi, xii, xiv, xviii, xix, xxii, and 5, 7, 9, 10, 12, 16, 20, 23-26, 29-33, 35, 40, 42, 43, 45, 48, 49, 50, 57-60
Social Behaviour	i, iii, iv, ix, x, xviii, xx, xxii, xxiii, and 6, 10-12, 14, 42, 46, 48, 51, 53-56, 59, 62
Social Cohesion	xi, xvi, xxii, xxiii, and 7, 10, 11, 14, 21, 27, 29, 31, 35, 55, 59, 62