● 成果报告 Original Article

Female Secondary Students' Sport Ability Beliefs and Regulatory Styles: Relationships with Enjoyment, Effort and Boredom

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Abstract: Physical activity participation among young girls has been a matter of concern. This study examines the relationships between sport ability beliefs, perceived competence and regulatory styles, and identifies subgroups of girls with distinct profiles based on sport ability beliefs and regulatory styles. Three distinct clusters of girls are found with different levels of enjoyment, effort and boredom. In summary, this study provides insight for the combined roles of sport ability beliefs and self-determination theory in the promotion of physical activity among female secondary students.

Keywords: sport ability beliefs; self-determination theory; regulatory style; enjoyment; effort; boredom

初中女生的运动能力信念和调节方式:与愉快、努力和厌烦的关系

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摘要:女生参予体育活动已经成为众所关注的问题。考察了运动能力信念、能力知觉和调节方式的关系,并且依据运动能力信念和调节方式的不同,按照愉快、努力和厌烦的水平,确定了三个不同的初中女生的动机模式。为在促进初中女生参与体育活动中考虑运动能力信念和自我决定理论提供了依据。

关键词:运动能力信念;自我决定理论;调节方式;愉快;努力;厌烦

中图分类号:G804.82 **文献标识码**:A **文章编号**:1005-0000(2003)01-0013-06

1 Introduction

Physical activity participation among young people has been a matter of concern to physical educators, education authorities, parents and politicians for years. Regular participation in physical activity provides many short and long-term benefits for young people in terms of physiological, psychological, and physical effects on their health. It is documented that the benefits of regular physical activity in young people include areas such as cardiovascular fitness, psychological health, skeletal health, blood pressure, body composition, and glucose, insulin, and blood lipids levels[1,2,3]. Despite the evidence provided for the benefits of physical activity participation, there is a decline in participation in physical activity in young people over their teenage years and this decline is particularly obvious in girls. Many studies have shown that adolescent girls are less likely than their male counterparts to participate in physical activity. As a result, they may put themselves at a greater risk of health diseases, as well as miss out on the other benefits often claimed for participation in physical activity and sport, such as the acquisition of a range of physical competencies that can contribute to the development of self-confidence and self-esteem. In psychological research, the key challenge is to examine the factors that might influence girls' likelihood of being physically active, including the beliefs and motives held by them, and this area has been identified as a research priority.

One possible reason why girls do not like sport or exercise is a pre-existing belief that they are not "cut out" to be sporty people. This is closely linked to two different ways in which people construe ability in achievement settings such as sport and physical education (PE). According to Dweck and her colleagues, some people see ability as an acquirable skill that can be increased through practice and effort [4,5,6]. People with this incremental theory adopt a learning or task goal in skill development. They tend to view mistakes as part of

收稿日期:2002-9-20;修回日期:2003-01-08;录用日期:203-03-30

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learning and seek challenges that provide opportunities to increase their skills and competencies. In contrast, some view ability as a capacity or fixed entity, and they cannot do very much to change that inherent aptitude. These people tend to adopt a performance or ego goal, and they strive to establish how much ability they have as compared with others. In doing so, they prefer tasks that can demonstrate their superiority and avoid tasks that can show up their inadequacy. High effort exertion is seen as low ability, so easy tasks are preferred. When faecng obstacles, children with entity beliefs showed detrimental performance, and negative affect and cognitions. In comparison, those with incremental beliefs tend to show more adaptive motivational patterns, such as persistence, positive affect and effective problem solving strategies [7,8,9]. Wang and Biddle found that high incremental belief is one of the key factors affecting intrinsic motivation towards PE. Entity or fixed belief, however, resulted in less adaptive motivational profiles[9]. They also found that girls tended to be over-represented in the less adaptive motivational profiles as compared to boys.

Intrinsic motivation is doing something for its own sake and not for external rewards, whilst extrinsic motivation is doing something as a means to an end. It is recognised that participation in physical activity should be intrinsic rather than extrinsic. However, motivation is not a simple dichotomous concept. In the self-determination theory proposed by Deci and Ryan, motivation is proposed to be a multidimensional concept[10,11,13]. They presented a more differentiated view of motivation to explain the perceived forces that regulate human behaviour. There are at least four main types of regulatory processes: external regulation, introjected regulation, identified regulation, and intrinsic regulation. The first three types are seen as extrinsic motivation with varying degree of relative autonomy. External regulation is characterised by behaviour that is controlled by external rewards or punishments. Introjected regulation is behaviour controlled by self-imposed pressure, such as avoidance of guilt and shame. Identified regulation involves acting out because behavinur is seen as personally important. Finally, intrinsic regulation is behaviour performed for interest and enjoyment. Ryan and Connell suggest that these four different types of motivation lie along a continuum of relative autonomy[13]. A Relative Autonomy Index (RAI) can be computed by weighting each subscale. Positive RAI indicates more self-determined regulation, whereas negative RAI indicates more controlling regulation. Furthermore, a state of lacking the intention to act, called amotivation, exists. This is a nonself-determined regulation that results from either not valuing the activity or lack of competence to produce the necessary outcome.

The main theoretical assumptions of self-determination theory are three innate psychological needs that are the basis for human motivation. The three needs are the needs of autonomy, competence and relatedness (social needs), and they are crucial in the energisation of human behaviour[10,14]. The need for autonomy is defined as the need to feel ownership of one's behaviour [15]. The need for competence refers to the need that an individual wants to produce desired outcomes and to experience mastery and effectiveness when dealing with one's environment [10,12]. The need for relatedness is the need to feel that one can relate to others and with the social world in general[10]. People are motivated to satisfy these needs because they are considered essential for the development of the self in terms of growth, social development and personal well-being [10,11,12,14]. When these three needs are satisfied, intrinsic motivation increases. If the three needs are not fulfilled, intrinsic motivation will decrease.

Both sport ability beliefs and self-determination theory postulate links between an individual's goal orientations, cognitions, affect and subsequent behaviour. For example, incremental beliefs lead to task orientation, and entity beliefs underpin the adoption of ego orientation [3]. Task orientation is directly linked to intrinsic motivation, whilst ego orientation is linked to extrinsic motivation [23]. However, studies have often investigated these two motivational theories in isolation. little is known about the summation effects of these two theories within the same individual. The purposes of the present study: to explore the relationships between sport ability beliefs, perceived competence and regulatory styles, and to find out whether there are subgroups of female secondary school students with distinct profiles based on the two main theories. If yes, then how do the different profiles vary in terms of three important outcomes of motivated behaviour in PE (enjoyment, boredom, and effort)?

2 Methods

2.1 Participants and Procedure

The participants were 345 female students from a single sex secondary school in Singapore. The Secondary Two students ranged in age from 12 to 14 years (M = 13.51; SD = 0.33). Permission for the study was granted by the principal and head of PE department, and no pupil refused to take part. Questionnaires were administered in quiet classroom condition with the presence of research assistants. When completing the questionnaire, participants were informed that there were no right or wrong answers. They were assured of the confidentiality of their responses, and were encouraged to ask questions if necessary.

2.2 Measures

(1) Sport Ability Beliefs. The English version of the 'Conceptions of the Nature of Athletic Ability Questionnaire, Version 2' (CNAAQ-2) was employed to examine incremental and entity beliefs [9]. Incremental beliefs were assessed through the two subscales reflecting 'Learning' (3 items, e.g., 'to be successful in sport you need to learn techniques and skills, and practice them regularly') and 'Improvement' (3 items, e.g., 'how good you are at sport will always improve if you work at it'). Entity beliefs were measured through two subscales reflecting 'Stable' (3 items, e.g., 'it is difficult to change how good you are in sport') and 'Gift' (3 items, e.g., 'to be good in sport you need to be naturally gifted'). Responses were made on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale was developed from that used by Sarrazin et al[23],and revised by Wang and Biddle [9]. The internal consistency of the incremental beliefs (a =0.87) and entity beliefs (a =0.83) for this study were satisfactory.

(2) Relative Autonomy Index (RAI). The Perceived Locus of Causality (PLOC) scale developed by Goudas, Biddle and Fox was used to assess four types of regulatory styles in the PE context[22]. The stem for all items was 'I take part in PE…'. External regulation (e.g., 'because I'll get into trouble if I don't') and introjected regulation (e.g., 'because I'll feel bad about myself if I don't) were assessed through four items each. Identified regulation (e.g., 'because I want to improve in PE') and intrinsic regulation (e.g., 'because PE is fun') were measured through three items each. Responses were also made on 5-point scales similar to the CNAAQ-2. An overall relative autonomy index (RAI) was calculated by using the following procedure: external regulation x (-2) + introjected regulation x (-1) + identified regulation x (1) + intrinsic regulation x (2). This serves as an indicator of a person's motivational regulation, with positive scores indicating more autonomous regulation (i.e., self-determined) and negative scores more controlling regulation. Cronbach's alphas for external regulation, introjected regulation, identified regulation, and intrinsic regulation were 0.87,0.65,0.73, and 0.86 respectively.

(3) Amotivation. Amotivation was assessed by three items modified by Goudas et al.[23] from the Academic Motivation Scale[23]. The stem for the items is 'I take part in PE …'. The three items are: 'but I really don't know why', 'but I don't see why we should have PE', and 'but I really feel I'm wasting my time in PE'. Answers were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). The scale was internally consistent (a =0.76).

(4) Perceived Competence. The Sport Competence items from the Children's version of the Physical Self-Perception Profile (PSPP-C) were administered [24]. The internal consistency of this sub-scale was satisfactory (a =0.82). Responses were given on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

(5) Intrinsic Motivation Inventory. Three subscales of the Intrinsic Motivation Inventory (IMI) were adapted to assess enjoyment (5 items, e.g., 'I usually enjoy playing sport'), effort (5 items, e.g., 'I tried very hard in PE'), and boredom (3 items, e.g. 'I usually find doing PE very boring')[9,25]. The items were measured on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alphas for enjoyment, effort, and boredom were 0.90, 0.84, and 0.76 respectively.

(6) Physical Activity Participation. Participants were asked to indicate whether they represented school in any sport or game. In addition, single items were used to gather information on frequency and duration of physical participation.

3 Results

3.1 Descriptive Statistics

21.9% of the students were school athletes and 78.1% were non-athletes. In terms of physical activity participation, only about 22% of the girls indicated that they exercised more than three times a week, 47.6% of the girls indicated that they exercised less than that frequency. When asked about the duration of physical activity participation,24.6% indicated that they did less than one hour of physical activity on average per week. 38.6% exercised between one to three hours per week, 12.2% spent between three to six hours weekly in playing sport or exercise and 24.6% spent more than six hours per week. Athletes were more physically active compared to non-athletes.

The means, standard deviations and correlations between key variables of the overall sample are contained in Table 1. Overall, the female pupils had high incremental beliefs orientation, positive RAI, low amotivation and moderately high levels of perceived competence. They tended to report high enjoyment, high effort exertion and low boredom in PE classes. Incremental beliefs were positively correlated with RAI, perceived competence, enjoyment, and effort exertion. Entity beliefs, in contrast, were negative related to RAI and perceived competence. RAI was negatively correlated with

Table1 Descriptive Statistics and Zero-Order Correlations between Key Variables of the Overall Sample

	Mean	SD	1	2	3	4	5	6	7	8
1. Incremental	3.92	0.74	--							
2. Entity	2.79	0.81	-0.41**	--						
3. RAI	3.75	4.38	0.43**	-0.32**	--					
4. Amotivation	2.14	0.92	-0.35**	0.34**	-0.76**	--				
5. Competence	3.02	0.67	0.46**	-0.32**	0.52**	-0.55**	--			
6. Enjoyment	3.68	0.87	0.44**	-0.20**	0.77**	-0.62**	0.58**	--		
7. Boredom	2.30	0.78	-0.36**	0.34**	-0.73**	0.65**	-0.46**	-0.71**	--	
8. Effort	3.47	0.71	0.47**	-0.28**	0.69**	-0.55**	0.55**	0.68**	-0.59**	--

Note: **P<0.01

amotivation and boredom, and positively related to perceived competence, enjoyment, and effort. Amotivation was negatively related to enjoyment, effort exertion, and perceived competence.

3.2 Cluster Analysis

The purpose of this present investigation was to examine the roles of sport ability beliefs and regulatory styles of secondary female students in PE. A hierarchical cluster analysis was conducted using SPSS for Windows (Version 10.0). Five variables were used to classify students into homogenous groups: sport ability beliefs (incremental and entity), Relative Autonomy Index (RAI), amotivation, and perceived competence. Prior to the main analysis, all the variables were standardized using Z scores (mean of 0 and a standard deviation of 1). This is necessary to prevent variables measured in larger units (RAI has a range of -12 to 12) from contributing more towards the distance measured than the variables utilizing smaller units [29].

Ward's method was used as the clustering method because it minimises the within-cluster differences and to avoid problems with forming long, snake-like chains found in other methods such as the single-linkage procedure [29]. The agglomeration schedule and dendrogram were used to identify the number of clusters. A three-cluster solution was found suitable using both criteria.

The cluster size, means, standard deviations, and z-scores of the three clusters are shown in Table 2. A one-way Multivariate Analysis of Variance (MANOVA) was conducted with the five clustering variables as dependent variables and clusters as independent variable. The results showed that all the clusters were distinct (Pillai's Trace =0.802, $F(10, 674) = 45.12$, $P < 0.001$, $\eta^2 = 0.40$), with F values ranging from 65.21 to 234.88 ($P < 0.001$).

Table 2 Cluster Means, Standard Deviations, and Z Scores for the Three-Cluster Solution

	Cluster 1 (n=38)			Cluster 2 (n=126)			Cluster 3 (n=179)		
	Mean	SD	Z	Mean	SD	Z	Mean	SD	Z
Incremental	2.91	0.76	-1.37	3.73	0.58	-0.26	4.26	0.57	-0.46
Entity	3.70	0.77	1.08	3.04	0.74	0.30	2.40	0.69	-0.46
RAI	-2.29	2.48	-1.38	1.26	3.08	-0.57	6.77	2.73	0.69
Amotivation	3.40	0.71	1.37	2.63	0.70	0.53	1.53	0.53	-0.66
Competence	2.11	0.51	-1.32	2.78	0.46	-0.37	3.37	0.55	0.52

3.3 Profiles of Cluster Groups

Figure 1 shows the graphical cluster profiles for the three-cluster solution of the hierarchical cluster analysis. Z scores of +/-0.5 or greater were used as criteria to describe whether a group scored relatively 'high' or 'low' in comparison to their peers. The first cluster can be labelled as the 'Entity' group. There were 38 girls in this cluster (11%), and 37 of them were non-athletes. The characteristics of this cluster of girls were that they had very high entity beliefs and amotivation. That is, they believed that sport ability was fixed, and they saw no point in trying in sport. They had very low incremental beliefs and RAI, and perceived themselves to be incompetent in PE.

The second cluster can be labelled as the 'Low Autonomy' group, with a RAI of -0.57 and amotivation of +0.53, incremental and entity beliefs, and perceived competence less than z-scores of +/-0.5. This cluster consisted of 37.0% of the total sample (n = 126), of which about 30% were school athletes.

The last cluster, with more than half the sample (52.0%, n = 179), can be labelled as the 'Incremental' group. The characteristics of this group of female students were high incremental beliefs, RAI and perceived competence. They tended to have low entity beliefs and amotivation. Almost 70% (n = 51 out of 74) of the school athletes belonged to this cluster.

To examine whether differences existed among the three clusters in self-reported enjoyment, boredom and effort exertion, a one-way MANOVA was conducted using the three outcome variables as dependent variables and the clusters as the independent variable. The results showed significant differences between the three clusters on the dependent measures [Pillai's Trace =0.47, $F(6, 678) = 34.63$, $P < 0.001$, h2 =0.23]. Test of between-subjects effects indicated significant differences existed for all three variables ($F(2, 340) = 115.59$, $P < 0.001$, η^2=0.40 for enjoyment, $F(2, 340) = 107.63$, $P < 0.001$, η^2=0.39 for boredom, and ($F(2, 340) = 73.32$, $P < 0.001$, η^2=0.30 for effort). Table 3 contains the means and standard deviations of the dependent variables for the three clusters. Post-hoc tests using Tukey's Honestly Significant Difference (HSD) were conducted to examine the pairwise comparison between the three clusters. Results showed that the 'Incremental' group had highest enjoyment and effort and lowest boredom. In contrast, the 'Entity' cluster had lowest self-reported enjoyment and effort and highest boredom. The 'Low autonomy' group scored somewhat in between for these variables. All differences were statistically significant at $P < 0.005$ levels.

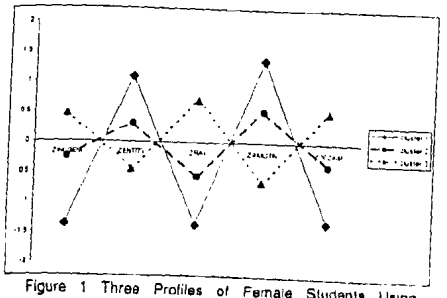

Figure 1 Three Profiles of Female Students Using Hierarchical Cluster Analysis.

4 Discussions

The first purpose of the present study was to explore the relationships between sport ability beliefs, perceived competence and regulatory styles. The results in general showed that female secondary school students believed that sport ability is changeable and can be improved through training. They tended to feel relatively autonomous to participate in PE classes. This is supported in the correlational analysis in that high incremental beliefs are positively associated with high RAI and perceived competence. These students tended to report high enjoyment and effort exertion, and low boredom in PE classes. Entity beliefs, however, were found to be negative related with RAI and perceived competence. The result shed light on the direct link between sport ability beliefs and motivational regulatory styles. Previous research has examined sport ability beliefs and feelings of self-determination separately [30,32].

Results also showed that three distinct clusters were found using different levels of sport ability beliefs, regulatory styles, including amotivation, and perceived competence. In addition, these three clusters also differed in other motivational variables associated with affect. The 'Entity' group, made up almost entirely of non-athletes, had very high entity beliefs and amotivation. That is, they believed that sport ability was fixed and they saw no point in trying in sport. They were also low in

Table 3 Means and Standard Deviations of the Dependent Variables by Cluster

	Cluster 1 (n=38)		Cluster 2 (n=126)		Cluster 3 (n=179)	
	Mean	SD	Mean	SD	Mean	SD
Enjoyment	2.61	0.77	3.28	0.66	1.17	0.65
Boredom	3.22	0.63	2.65	0.61	1.86	0.59
Effort	2.77	0.63	3.15	0.51	3.81	0.66

incremental beliefs, and they felt controlled into doing PE. This may explain the self-reported low levels of enjoyment and high boredom, as well as low level of effort exertion.

The contrasting cluster to the first cluster is the 'incremental' cluster, with almost 70% of athletes and the majority of the sample. This group of students believed that sport ability is something that can be changed and not fixed, and they were more intrinsic in their motives in PE classes. Perceived competence of these students were high. These students experienced high enjoyment. They tended to exert high effort and experienced low boredom in their PE classes.

This is consistent with previous studies that found that incremental beliefs is related to greater motivation towards exercise programme and that feeling of autonomy enhances enjoyment, effort exertion and reduces boredom in PE [30,32].

The present findings support the view that incremental theories of ability are associated with more adaptive motivational patterns, and believing that ability is fixed appears to be less motivationally adaptive. One reason could be that entity beliefs do not allow feelings of confidence and control over future outcomes, especially when perceived competence is low, thus resulting in less adaptive responses. In contrast, incremental beliefs, through the pursuit of task goals, allow the feeling that success is under one's personal control, hence resulting in more adaptive patterns [30,32].

In an effort to promote physical activity among female students, this study offers some insightful thoughts. First, it is necessary to promote incremental beliefs and dispel entity beliefs among female students in PE. Through focusing on the malleable aspects of sport ability, students are more likely to adopt a mastery approach in taking part in sport or physical activity. An entity belief could lead the students to feel that they are not able to produce the necessary outcomes, especially when they have doubts in their competence. Research has shown that although these two beliefs can be relatively stable personality traits, they can be highly dynamic as well [30]. In other words, individuals may have preference for one belief over another, but they also understand the opposing belief, and sometimes endorse it, depending on situational factors. Thus, PE teachers should focus on increasing students' incremental beliefs and downplay the role of entity beliefs.

Second, PE must provide an enjoyable experience such that students do not feel that they are taking part in physical education because of external rules or feeling of guilt. The results of the present study showed that when students are more self-determined or intrinsically motivated, they are more likely to adopt incremental beliefs and high perceived competence. These are important in increasing their likelihood in physical activity participation. In contrast, the more their behaviours are externally regulated, the less likely they would adopt incremental beliefs and perceive that they are physically competent. They are also less likely to be involved in physical activity.

In summary, this study provides support for combined ples of sport ability beliefs and self-determination theory in e promotion of physical activity among female secondary stu-ents. Future experimental studies may have to be conducted examine the underlying mechanisms of these two theories perating within an individual.

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● 成果报告 *Original Article*

建立与完善我国优秀运动员社会保障制度的必要性研究

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摘要：优秀运动员社会保障制度的建立与完善，将直接影响我国竞技体育的可持续发展。通过对我国优秀运动员社会保障制度发展的三个不同历史阶段特点的分析，总结了当前优秀运动员的社会保障制度存在的主要问题，对建立和完善我国优秀运动员社会保障制度的必要性进行了全面的分析。

关键词：中国；优秀运动员；社会保障制度

中图分类号：C80-05　　文献标识码：A　　文章编号：1005-0000(2003)02-0019-03

Study of Necessity to Establish and Perfect the Social Security Sytem for Elite Athletes in China

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Abstract: To establish and perfect the social security system for elite athletes will directly influence sustainable development of the competitive sports in China. The author analyzes the three different historical periods of the social security system for elite athlete and concludes the main problems. At last the article analyzed the necessity of establishing and perfecting the social security.

Keywords: China; elite athletes; social security system

社会保障是一项维护社会安定，促进经济发展，关系到全社会成员切身利益的经济制度和社会制度[1]。社会保障制度是工业革命和社会化大生产的产物，起始于社会救助[2]。不同社会制度的国家，尽管建立和完善社会保障的目的和方式不同，却都把社会保障作为发展经济，维护社会稳定的一项基本的社会制度。在我国，劳动者是国家的主人，享受社会保障是宪法规定的一项基本权利，从 20 世纪 80 年代中期开始的社会保障制度改革，相继出台了《国务院建立统一的企业职工基本养老保险制度的决定》、《国务院关于建立城镇职工基本医疗保险制度的决定》、《失业保险条例》、《城市居民最低生活保障条例》、《中共中央关于切实做好国有企业下岗职工基本生活保障和再就业工作的通知》等一系列法规文件，构建了一个以养老、失业、医疗三大社会保险制度和社会救助制度为框架的中国城镇社会保障体系的雏形[3]。

优秀运动员作为我国攀登世界竞技体育运动技术高峰的一支重要力量，是省、市、区体工队或国家队这一层次的运动员，是我国运动训练体制中的最高层次，它直接影响到我国的运动技术水平。优秀运动员作为一个特殊的群体，目前全国共有 1.4 万人左右[4]，单纯从人数来分析，这一群体的影响力是有限的，但由于优秀运动员位于我国运动训练体制（金字塔形）的塔尖地位，对运动训练体制及其他方面影响较大。优秀运动员社会保障制度的建立与完善直接关系到我国奥运战略的实现，关系到我国竞技运动水平的提高，关系到优秀运动队的稳定和业余运动训练的开展。我国优秀运动员的社会保障水平如何？当前存在哪些突出的问题？如何建立起适应社会主义市场经济和体育改革的具有中国特色的优秀运动员社会保障体系？本文将就这些问题进行系统、全面的探讨。

1　我国优秀运动员社会保障制度的发展沿革

1.1　建国初期到改革开放之前

建国初期，为了尽快提高我国竞技运动技术水平，充分体现社会主义制度的优越性，树立新中国在世界体坛的地位，强化对体育的管理，按照军队的建制，各省区市组建了体育工作大队，实行半军事化、半封闭式的管理。这种管理模式尽管有的省区市目前改为“省运动技术学院”、“省运动项目管理中心”和“省体育学院”等形式，但其管理机制仍然没有改变。运动员根据其运动成绩选拔进入省体工队进行训练，运动员在训期间训练、生活、学习实行高度集中。

1951 年，国家颁布了《中华人民共和国劳动保险条例（草案）》，其内容包括了疾病、负伤、生育、医疗、退休、死亡待遇和待业救济等项目，这一条例同样适用于运动员。1956 年，全国总工会办公厅、国家体委办公厅关于运动员在比赛中负伤应给予何种劳动保险待遇的通知中指出，“在实行劳动保险或某单位参加运动会或比赛而负伤时，可参照劳动保险条例的规定，按因工负伤待遇处理，未实行劳动保险条例的，亦可参照上述精神，按各单位的劳动保险集体合同或现行办法按因公负伤待遇

收稿日期：2002-11-02；修回日期：2003-02-20；录用日期：2003-04-10

基金项目：国家哲学社科基金资助项目“我国优秀运动员社会保障机制的研究”（00BTY005）子课题之一

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