

Physical Education and the Degree of Stress

by

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The purpose of this study was to examine a relationship between the degree of liking and disliking of sport and physical activity, and stress development.

We conducted a survey on Japanese junior high school students (129 boys, 139 girls) in 2007. The survey included such entries as 1) positive vs negative attitude toward physical education classes, 2) the degree of physical education classes-related stress, and 3) personality qualities (goal orientation, sports competence and active coping).

In our survey concerning the degree of predilection for physical education classes, the results were as follows: 171 subjects in Group A said they liked physical education classes; 39 subjects in Group B said they didn't like and 57 subjects in Group C chose "neither". Comparing the degree of stress from physical education classes, Group A scored significantly lower than the others by Tukey's multiple comparison test ($p < 0.05$).

Also, in order to find the key factor which determines the degree of liking and disliking of physical education classes, we measured various values among 52 subjects with a high degree of stress as a dependent variable, and analyzed the personality aspects as an independent variable. As a result, we found a negative correlation between stress levels and sports competence, whereas ego orientation and active coping had a positive effect on the degree of stress.

We showed that those liking physical education experienced low degrees of stress. Conversely, those individuals disliking sport and physical activity should not be expected to experience reduced stress while participating in sports. Furthermore, we can indicate sports competence as a determinant of stress reduction. Consequently, in order to stimulate regular participation in sports activity and to release its stress-reducing potential, it is necessary to develop childhood physical education classes to foster sports competence.

Key words: goal orientation, sports competence, coping

Introduction

Stress is pointed out as one of the important notions concerning the level of physical and mental health in modern society (Lazarus and Folkman, 1984; Selye, 1956). Selye (1950) defined stress as the non-specific response of the body to any demand. In this perspective, stress was, in effect, not an envi-

ronmental demand (which Selye called stressor), but a universal physiological set of reactions and processes created by such a demand (Lazarus and Folkman, 1984). On the other hand, Lazarus and Folkman, who had emphasized the relationship between the person and the environment in studying stress, suggested that stress is not a variable but a rubric consisting of many variables and processes (Lazarus, 1966; Lazarus and Folkman, 1984). They also indi-

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cated that psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being (Lazarus and Folkman, 1984).

Further research contributed to the accumulating of valuable information on stress. In reference to that research it should be noted that, as it is pointed out, stress can directly or indirectly cause various diseases (Aldwin, 1994; Dixon and Reid, 2000; Taylor, 1999). Consequently, attempts at reducing the degree of stress have become an important task nowadays. Therefore, it was expected that sport and physical activity would become a means of reducing the physical and mental stress. In fact, sport and physical activity has been used to deal with the physical and mental stress, which has proved successful.

For instance, Blumenthal et al. (1982) pointed out in their study that a regular 10-week workout regimen (i.e., walking and jogging) significantly reduces anxiety and stress. Brown (1991) has also pointed out a protective role that sport plays in the stressors of life, and has contributed to regarding physical and sporting activity as one of the life buoys for today's "stress society". The stress-reducing function of physical and sporting activity is also recognized in school education. This is evidenced by the New Education Curriculum Guidelines of health and physical education in Japanese schools, which underlie the necessity of physical exercises as an appropriate way of coping with stress.

On the other hand, physical and sporting activity, whose attributes involve competition and reaching goals, and are based mostly on interpersonal relations, can become a stress-inducing factor itself. It is especially easy to imagine that physical and sporting activity will be a stressor for people who are aware that they are not good at sports or who feel an aversion towards them. In other words, we can assume that for those who have a positive attitude towards sport, exercise becomes a stress-reducing factor while. Contrary, people who are negative about this form of activity are easily stressed by it.

The state of stress is caused by a stressing agent, however, even the same stress in different people, does not necessarily cause the same type of reaction, which varies from one individual to another. This points to an individual personality profile as one of the factors which determine the type of reaction to stress. The same is true of sporting activity. For example, Sway and Jones (1992) observed that com-

petence and goal-orientation (including task- and ego-orientation) are some of the psychological factors important for athletes. They also noted that a high degree of competence was related to a reduction of cognitive and physical anxiety, as well as an increase in self-confidence. Moreover, it was noticed that ego-orientation was related to increased cognitive anxiety and that task-orientation was connected with a reduction of physical anxiety and rise of self-confidence. Based on these observations, we can conclude that among the different elements that constitute personality, competence and ego-orientation are determining factors in stress in any sporting activity.

It is also true that individual stress-coping strategies become important factors in determining the reaction to stress (Lazarus and Folkman, 1984). Many researchers point out that adequate coping softens the shock caused by a stressor and attenuates the reaction to stress (Aldwin & Revenson, 1987; Felton & Revenson, 1984). So far, many different types of coping strategies have been proposed. Latack & Havlovic (1992) made a classification from two perspectives: focus- and method-oriented. In the latter, Billings & Moos (1981) distinguished three types of coping, of which they chose active-behavioral coping as the best stress-reducing method. Therefore, the present study attempts to examine the elements of active coping.

Considering the above, the purpose of this study was to examine the relationship between the degree of liking and disliking physical and sporting activity, and stress development, as well as the determinants of the reaction to stress. Therefore, we conducted a survey involving junior high school students and examined the intensity of liking and disliking physical education, with regard to the degree of stress. We also examined goal-orientation, sports competence and active coping behavior. Based on the questionnaire results, we tried to settle the question by verifying the hypotheses that follow;

Hypothesis 1: Respondents who dislike physical education have a high degree of stress

Hypothesis 2: There is a negative correlation between the stress level of the respondents and some of their personality aspects, such as goal-orientation, sports competence and active coping.

Methods

We conducted a survey on Japanese junior high school students (129 boys, 139 girls, 268 subjects in

total) in September 2007 in Yamaguchi prefecture in Japan. Data were collected directly from the survey respondents by distributing the anonymous questionnaires at their schools. The survey included such entries as 1) positive vs negative attitude toward physical education classes, 2) the degree of physical education class - related stress, 3) personal qualities (goal-orientation, sports competence and active coping).

Questionnaires

The questionnaire consisted of two parts. Part I focused on positive and negative attitudes toward physical education classes, and Part II analyzed personal qualities in relation to the degree of stress in physical education.

In Part I we asked the question "Do you like physical education classes?" and answers were requested on a 1 to 5 scale. To grade the entries related to the degree of stress in the second part of the questionnaire, we used the Stress Response Scale-18 (SRS-18), created by Suzuki (1997), which was based on GHQ (General Health Questionnaire, Goldberg, 1978), BDI (Beck Depression Inventory, Beck et al., 1979) and STAI (State-Trait Anxiety Inventory, Spielberger, 1970), after verifying its credibility and validity. This scale consists of three lower measures: "Depression-Anxiety", "Irritability-Anger" and

"Helplessness", and each of these contains six questions (18 entries in total). Additionally, in order to elicit answers to the question about the "degree of stress during physical education classes", we stressed the word "during" in the phrase at the beginning of the question. The subjects had to choose a reply using a 1 to 5 scale. For the entries related to goal-orientation, we used the scale measuring goal-orientation in a physical education class environment, created by Hosoda and Sugihara (1999), which was based on a modified version of the Task- and Ego-Orientation in Sport Questionnaire (TEOSQ), by Duda (1989) and Duda and Nicholls (1992). In this study we selected five positions, each concerning task-orientation and ego-orientation, reliable for their intrinsic coherence, and requested answers on a 1 to 5 scale. For the "sports competence" entries, 5 questions were extracted randomly from the physical ability scale, by Itho (1987), based on scales by Harter (1982) and Ryckman et al. (1982). Answers on a 1 to 5 scale were requested. For the "stress management" entries, after we had referred to The COPE questionnaire (Lyne and Roger, 2000), which is frequently used as a coping measurement scale, we used the stress management measuring scale for junior high school students, by Miura et al. (1998). The scale had been adjusted for use in the physical education class environment.

Results

The answers obtained from 129 (100%) male and 138 (99.3%) female respondents (267 or 99.6% subjects combined) were accepted as valid.

A. Positive vs negative attitude toward physical education classes and the degree of PE class - related stress

In our survey concerning the degree of predilection for physical education classes, the results were as follows: 171 subjects (96 males, 75 females) in Group A said they liked physical education classes; 39 subjects (6 males, 33 females) in Group B said they did not like sports classes, and 57 subjects (27males, 30 females) in Group C chose "neither". Comparing the degree of stress from these physical education classes, Group A scored significantly lower than Groups B and C by Tukey's multiple comparison test ($MSe=188.5$, $df=264$) ($p<0.05$) (Table 1).

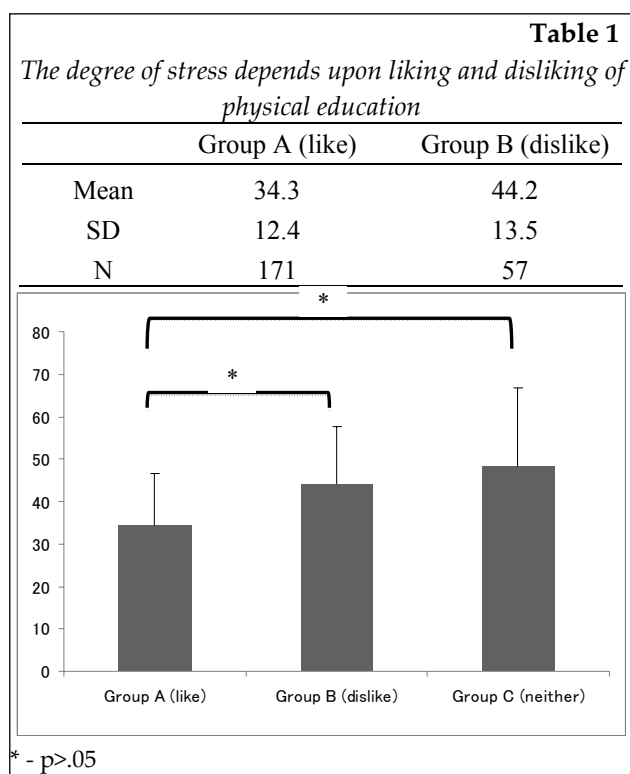


Table 2

		Mean and SD of each item			
		Sports competence	Task orientation	Ego orientation	Coping
High-stress group (N=52)	Mean	14.2	17.5	16.4	32.4
	SD	4.9	3.7	3.3	6.1
Low-stress group (N=57)	Mean	13.7	20.2	17.3	31.1
	SD	5.7	4.3	5.2	9.8
The others (N=158)	Mean	11.9	18.3	15.3	29.0
	SD	4.9	4.1	5.1	7.6

B. Factors determining the degree of PE class-related stress

In order to find the key factor which determines the degree of preference for physical education classes, we measured values among 52 subjects with a high-stress degree as the dependent variable, and analyzed the personality aspects, such as task-orientation, *ego*-orientation, competence and active coping, as independent variables (table 2). Subjects were divided into low- and high-stress groups, based up analyzed data which were converted to deviation values. The group with deviation values above 60 was defined as a high-stress-level group, and that with deviation values below 40 was characterized as a low-stress-level one. Having found a strong correlation between task-orientation and *ego*-orientation ($R=0.87$) by the restricted maximum likelihood estimation (REML), we then conducted a multiple regression analysis of all the variables except for task-orientation in SAS-JMP8. Results showed a negative correlation between stress levels and sports competence ($\beta=-0.48$, $t(48)=-3.23$, $p<.01$), whereas *ego*-orientation ($\beta=0.46$, $t(48)=2.97$, $p<.01$) and active coping ($\beta=0.46$, $t(48)=3.07$, $p<.01$) had a positive effect on the degree of stress in physical educa-

tion classes ($F(3,48)=10.70$, $p<.01$, Table 3).

Discussion

We demonstrated that both male and female students who liked physical education, experienced a low-degree of stress. Thus, we were able to confirm the first hypothesis, which shows that people who dislike physical and sporting activity will not benefit from the stress-reducing potential inherent in exercise and sport. In fact, the opposite is true: exercise can become a stress-inducing factor.

As a result of the analysis, we found a positive correlation between stress levels and active coping & *ego*-orientation, whereas sports competence had a negative correlation with stress levels. That is to say, a negative correlation between the active type of coping and stress degree was not proved. As mentioned above, apart from active coping there are also other types of coping, such as emotion-focused coping and avoidance (Lyne and Roger, 2000). Researchers point out that in stressful circumstances in which one is able to control, a type of stress control which consists of actively facing the problem and finding solutions to it is effective, however, in situations in which no active control of the problem is possible, a more adequate strategy to reduce the stress might be in trying to induce mood changes rather than directly looking for a solution to the problem (Baum et al., 1983). Based on these facts, we can suggest that active stress management did not succeed in reducing stress caused by PE classes, because students found it hard to control the classes which were supervised by the teachers.

Having found a positive correlation between *ego*-orientation and stress levels & task-orientation, we are positive that a strong goal-orientation can contribute to actually increasing stress, irrespective of *ego*- and task-orientation. Our conclusion does not necessarily correspond with the findings of Swain

Table 3

Result of the multiple regression analysis			
Independent variables	β	t	
Sport competence	-0.48	-3.24	**
Ego-orientation	0.46	2.97	**
Active coping	0.46	3.07	**
R	0.63		
R ²	0.40		
F	10.70	**	
** - $p<.05$			

and Jones (1992), who stated "there is a relationship between ego-orientation and increased cognitive anxiety, and between task-orientation and a reduction of physical anxiety". Therefore, we suggest a need for further studies.

Alternatively, we found a negative correlation between sports competence and the degree of stress, which supported our second hypothesis about sports competence. As has been pointed out by White (1959), who was the first to introduce the concept of competence into psychology, since competence is one of the fundamental elements of intrinsic motivation, we can now acknowledge the fact that sports competence is negatively correlated to stress intensity. Barnett et al. (2008) also argued that developing

a high perceived sports competence through object control in childhood is important for both boys and girls in determining adolescent physical activity participation and fitness. Thus, it can be inferred that sports competence is also related to a child's growth. Therefore, we confirmed that sports competence is an important issue in physical education and sport.

In conclusion, we can indicate sports competence as a determinant of stress reduction in sport and exercise. Consequently, in order to stimulate regular participation in sports activity and to release its stress-reducing potential, it is necessary to develop physical education classes to foster sports competence.

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