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A Study on the Factors Determining Sport Behavior: Some Methodological Problems

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スポーツ行動の規定要因に関する研究 — その方法論的課題 —

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今日、人はどのようにしてスポーツを始めるようになるのか、そこにどのような要因が関与しているのか、スポーツを実施するためにはどのような条件が必要なのか、人びとのスポーツ行動を規定する要因は何かといったスポーツへの社会化をめぐる問題は、スポーツ社会学における重要な研究課題となっている。わが国のスポーツ社会学は、実態調査を中心にして、多かれ少なかれこの課題にアプローチしてきた。最近、各種統計手法が開発され、体育やスポーツの研究分野においてもこれらが取り入れられるようになった。特に1970年代以降、これらの統計手法を適用した注目すべき研究がみられる。そこで本研究においては、わが国においてスポーツ行動の規定要因に関する研究として位置づけられる18の文献を取り上げ、そこにいかなる方法論的課題があるのかについて考察した。すなわち、第1にスポーツ行動の捉え方について、第2に変数選択の問題について、そして第3にデータ分析の方法の問題について検討を加えた。研究の結果、以下のような点が示唆された。

1. スポーツ行動の捉え方に関しては、スポーツ行動自体よりも説明変数の選定の問題に注意が払われており、大部分の研究者が単に量的にスポーツの実施程度でもってスポーツ行動を捉えている。特に、対象者をスポーツ実施群と非実施群に分けてその違いを明らかにしたり、両群を判別したものが多い。従って、スポーツの内容や目的、種目、技術水準といった質的側面についてはほとんど検討されていない。
2. スポーツ行動の説明変数（要因）は、研究者の仮説、研究視点、枠組に基づいてアプリオリに選定されているが、説明変数選定のための体系的、理論的モデルが提供されていない。この点に関して、著者らは新たにスポーツ行動の説明モデルを提示した。
3. データの分析方法は、クロス分析、相関係数、数量化理論、重回帰分析、段階的群残差回帰方式、パス解析などが適用されている。なかでも、林の数量化理論第II類の適用例が最も多い。数量化理論は、操作的、機能的な統計数理モデルであり、変数やカテゴリー区分が異なると分析結果も異なるため、過度の一般化を行うには問題がある。

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Introduction

The number of persons who enjoy sport has been increasing since the end of the war. According to the survey of public opinion on fitness and sport by the Prime Minister's Office²³⁾, 64% of the Japanese adults enjoyed sport more than once in a year in 1988. In such a situation, the issues on socialization into sport,

such as how individuals become involved in sport, what conditions are needed for people to play sport, or what factors determine their sport behavior, have received much research attention. Sport sociology should present meaningful knowledge for the theory of sport behavior. Especially, since sport sociology has no systematical theory, it is important to clarify the factors which determine or influence people's sport behavior.

In foreign countries, this kind of study has been conducted by, for example, Kenyon¹¹⁾, Greendorfer⁴⁾, Reid²⁴⁾, Fasting²⁾, Laakso¹⁷⁾ and so on. These studies pointed out several factors for explaining sport behavior. As a matter of course, sport sociology in Japan has been grappling with this problem through investigation. Nowadays, various statistical techniques have been developed and these are likely to be used in the researches of sport and physical education. In Japan, noteworthy studies on sociological and psychological factors influencing people's sport behavior have been carried out since the 1970s. The purpose of this paper is to examine methodological problems in such kind of studies. This study was carried out using literatures. Namely, eighteen papers, presented by Japanese researchers from 1974 to 1984, were adopted. All of these were recognized as studies on the factors determining sport behavior and shown in Table 1. We examined them concerning, firstly, a definition of sport behavior, secondly, selection of explanatory variables, and thirdly analytical technique of the data.

1 Definition of sport behavior

Concerning definition of sport behavior, Kenyon¹²⁾, using a conception of sport involvement, divided it into two types, primary sport involvement and secondary sport involvement. Primary involvement means actually playing sport. However, it can be classified into some patterns according to its purpose or its form. For example, (1)competitive sport or championship sport, (2)sport for recreation for having fun, (3)sport for keeping healthy and developing physical fitness, (4)sport participation as an event in school, work place or community, would be considered as primary involvement. Moreover, from the viewpoint of organization, there are two cases. One is organized sport as played in a club and the other is informal or unorganized sport played freely.

On the other hand, secondary involvement means watching sporting game at a stadium as a spectator, watching or listening to broadcasts of sporting events via TV or radio and reading sporting news in a newspaper or magazine. Each of these definitions of sport behavior could be a subject of study. In the case of Japan, studies focusing on secondary sport involvement are extremely few. All of eighteen papers taken up in this study dealt with primary sport involvement.

Examining these studies, it can be said that much attention has been paid to independent or explanatory variable and that sport behavior as a dependent variable in itself has not been taken into consideration so much. In the greater part of these studies, sport behavior was defined by the degree to which people participate in sport. To put it concretely, researchers have usually tried to divide the subjects into two groups, one group participates in sport and the other does not, and to clarify a difference between the two groups or search for factors characterizing them. For example, the studies conducted by Nagayoshi et al.¹⁹⁾, Ikeda et al.⁵⁾, Tatano et al.²⁵⁾ and Kanezaki et al.⁸⁾ are typically categorized in this case. For example, Kanezaki et al.⁸⁾ and other some researchers classified the subjects who participate in sport activity more than once in a week into sport participant group, and the subjects once or twice in a month and below that and not at all into sport non-participant one. This kind of method has not basically changed even today. However, it is too simple to define sport behavior merely by its quantitative frequency because people's primary sport involvement in modern society has been diversifying. Of course, some researchers such as Matsuda et al.¹⁸⁾, Nishigaki et al.²¹⁾, Tokunaga et al.²⁹⁾ and Tatano et al.²⁶⁾ analyzed the factors paying attention to event and pattern of sport behavior. However, it can be pointed

Table 1 : References Concerning Studies on the Factors Determining Sport Behavior

No	Researcher (s)	Year	Title of paper	Subjects of investigation	Number of subjects	Statistical technique	Number of variables
1	Nagayoshi, H. et al. ¹⁹⁾	1974	Analysis of Factors to develop Sport Activity : Using the Method of Hayashi's Quantification Theory.	Persons over 15 years of age	3413	Hayashi's quantification theory II	15
2	Ikeda, M. et al. ⁵⁾	1976	Analysis of Factors Determining Sport for Young Workers	Young workers	200	Hayashi's quantification theory II	13
3	Kado, O. ⁶⁾	1976	The Multi-Cross Analysis of Sport Activity.	Adults over 30 years of age	1754	Multi-cross analysis	3
4	Kanezaki, R. et al. ⁷⁾	1976	A Study of Extracurricular Sport Activities in University (1) : On Contributing Factors of Sport Activities.	University students	484	Correlation coefficient & proportion	18
5	Arai, S. et al. ¹⁾	1977	A Positive Research on Sport Behavior (2) : Correlations between 16 Variables Constituting Sport Behaviors.	Adults over 20 years of age	3625	Cross analysis & Cramer's coefficient	16
6	Komuku, H. et al. ¹⁵⁾	1978	An Analysis of the Effect of Work Factors on Sport Involvement : A Quantitative Study by Multiple Regression Model.	Workers Average age was 34	605	Multiple regression analysis	22
7	Niwa, T. et al. ²²⁾	1978	On the Factors Determining Women's University Students' Participation in Sports.	Female university students	996	Analysis of variance & stepwise multiple regression	6
8	Nishigaki, H. et al. ²¹⁾	1979	A Life-Systematical Study on Sport Behavior (1) : The Relationship between Sport Behavior and Constituent of Life System.	Adults over 20 years of age	458	Cross analysis & Cramer's Coefficient	84
9	Tsubota, N. et al. ³⁰⁾	1979	A Life-Systematical Study on Sport Behavior (II) : An Analysis of Relation between Sport Behavior and Structure of Life-Consciousness.	Adults from 20 to 60 years of age	645	Cross analysis & Cramer's coefficient	59
10	Matsuda, Y. et al. ¹⁸⁾	1979	A Corroborative Research on the Sport Behavior (3) : On the Choice Making Behavior to Sport Events.	Adults over 20 years of age	2096	Hayashi's quantification theory II	21
11	Kumeno, Y. et al. ¹⁶⁾	1979	A Study on Sport Involvement of College Students : An Exploratory Path Analysis.	University students	452	Path analysis	8
12	Tatano, H. et al. ²⁵⁾	1980	Multivariate Study on Sport Participation (1) : Analysis of Elements by Hayashi's Quantification Theory (II) .	Persons over 18 years of age	344	Hayashi's quantification theory II	44
13	Kanezaki, R. et al. ⁸⁾	1981	A Study on the Factors Predicting Sport Activity (1) : Analysis of Sociological Factors.	University students	577	Hayashi's quantification theory II	50
14	Tokunaga, M. et al. ²⁷⁾	1981	A Study on the Factors Predicting Sport Behavior (2) : Analysis of Psychological and Physical Factors.	University students	562	Hayashi's quantification theory II	84
15	Tokunaga, M. et al. ²⁸⁾	1982	A Study on Factors Determining Students' Sport Activities (1) : Analysis of Psychological and Physical Factors.	University students	562	Hayashi's quantification theory II	84
16	Tatano, H. et al. ²⁶⁾	1982	A Study on the Factors Determining Students' Sport Activities (2) : Analysis of Social Factors.	University students	577	Hayashi's quantification theory II	50
17	Kanezaki, R. et al. ⁹⁾	1982	A Study on the Factors Determining Students' Sport Activities (3) : Analysis of Factors Relating to Sport.	University students	576	Hayashi's quantification theory II	51
18	Kanezaki, R. et al. ¹⁰⁾	1984	A Social Psychological Study on the Factors Determining Playing Gateball among Senior Citizens.	Adults over 50 years of age	643	Hayashi's quantification theory II	40

out as a problem that qualitative aspects of sport behavior such as its content, purpose, type and level of skill have not been paid attention to so much. Though definition of sport behavior depends on the purpose or perspective of research, the definitions from diverse aspects may be required hereafter.

2 Problem on selection of variables

The second point we have to consider is the problem on selection of explanatory variables. Sport behavior can not be explained merely by sociological factors. As factors with reference to sport behavior are so varied, it would not be easy to clarify them. Kenyon and McPherson¹⁴⁾ presented a general model for explaining sport socialization process and indicated three main factors, personal attributes, significant others and social situations, which exert influence upon learning of sport role. Personal attributes mean the factors characterizing an individual. Significant others mean the persons, for example, parents, siblings, relatives, friends, teachers, coaches and so on, who influence sport socialization process. Social situations mean groups, institutions, places or agencies, etc. which exert influence an individual. Their model was often quoted by the researchers interested in a study of sport socialization.

Generally speaking, explanatory variables or factors adopted by researchers would be classified into five categories, (1)demographic, (2)social, economic and cultural, (3)environmental, (4)psychological and (5)physical ones. The number of variables for explaining sport behavior is diversified in the past studies (See Table 1). We can point out that there are two methods concerning selection of variables. One is to take up one or a few variables and to analyze its influence on sport behavior. For example, Kado⁶⁾ took up three variables, leisure as a factor related to time, standard of living as an economic factor and experience of sport club in the past, and analyzed a relationship between assortment of these variables and participation in sport behavior. The other method is to take up many variables in advance and try to search the valid factors which explain sport behavior. The studies conducted by Nishigaki et al.²¹⁾, Tsubota et al.³⁰⁾, Tatano et al.^{25),26)}, Kanezaki et al.^{8),9),10)}, and Tokunaga et al.^{28),29)} are categorized in this case.

Until now, explanatory variables have been selected a priori in accordance with researcher's viewpoint or hypothesis. For example, the studies have shown gender, age, occupation, income, health, fitness, an experience of sport club, friend who also participate in sport, encouragement by friends and some kind of sport consciousness as the factors determining people's sport behavior. However, these reported results should not be generalized since there are differences among those studies concerning subjects of investigation, contents of explanatory variables, method of analysis and so on. For example, as for occupation, Tatano et al.²⁶⁾ reported a contradictory result to that of Komuku et al.¹⁵⁾. Similarly, we can find a difference in results between Nagayoshi et al.¹⁹⁾ and Tatano et al.²⁶⁾ as for age, Kanezaki et al.⁷⁾ and Niwa et al.²²⁾ as for an attitude toward physical education activity, Kumeno et al.¹⁶⁾ and Kanezaki et al.⁸⁾ concerning experience in a sport club in high school. Of course, a few same results were shown, too. Kado⁶⁾, Ikeda et al.⁵⁾, Komuku et al.¹⁵⁾, Kumeno et al.¹⁶⁾ and Kanezaki et al.⁸⁾ equally indicated that sport experience in the past and encouragement by friends would influence people's sport behavior. It is necessary to adopt the same kind of variables so as to compare with these studies. However, such an attempt has not yet been made.

In addition, it is a big problem that researchers did not present sufficient systematic or theoretical models in selection of explanatory variables. Although, when the degree of explaining sport behavior is insufficient, variables should be selected again. This work also needs theoretical background. We have been studying this point and made an explanatory model for sport behavior as shown in Figure 1. This model is based on theory for behavior prediction by psychologist Fishbein³⁾ and theory of sport socialization by Kenyon and McPherson¹⁴⁾. People's sport behavior could be explained or predicted by their behavioral intention toward sport. Behavioral intention toward sport is related to people's sport conscious-

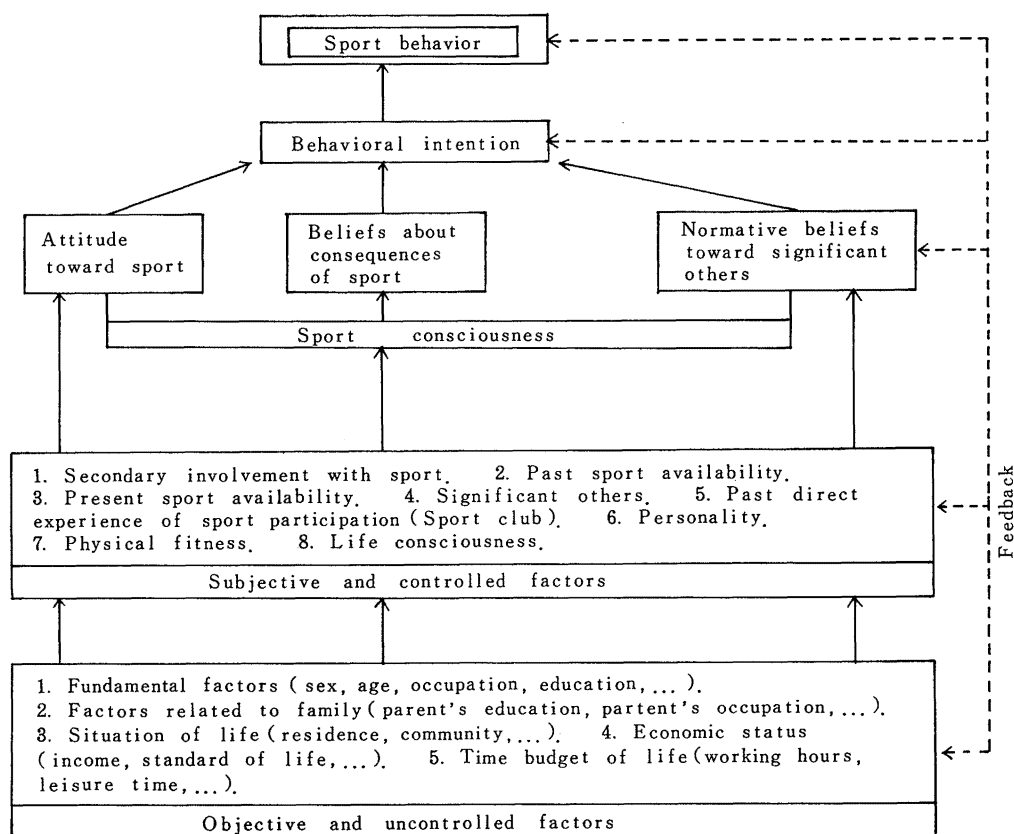


Fig.1: Explanatory Model for Sport Behavior

ness such as (1) affective attitude toward sport in a given situation, (2) beliefs about consciousness of playing sport and (3) normative beliefs which mean beliefs toward expectations of significant others. And, sport consciousness has a relation to, what is called, the subjective and objective factors. Some of them can be controlled but others can not. That is to say, we think sport behavior should be defined in a reciprocal relation between people's sport consciousness and demographic, environmental, social and physical conditions surrounding them. Though this model is only one example of many, its validity was verified in our study²⁹⁾. At any rate, we would like to stress the necessity of a theoretical model in case of selection of explanatory variables.

3 Problem on analytical technique

Finally, we have to examine the problem of analytical technique or statistical model. It is natural that analytical technique would vary in accordance with the purpose of study, researcher's viewpoint and kind of data. The analytical techniques used in studies on the factors determining sport behavior in the past can be classified into the following six kinds, (1) cross analysis using chi-square test or Cramer's coefficient of contingency, (2) analysis using some sorts of correlation coefficient, (3) quantification theory, (4) multiple regression analysis, (5) analysis of variance and stepwise multiple regression and (6) path analysis. Studies through investigation in sport sociology in Japan once adopted mainly cross analysis which is the most simple statistical technique. The researchers, using this technique, have been clarified the differences

between the two groups, sport participants and sport non-participants. In this analysis, chi-square test is generally adopted to evaluate the significant difference between the two groups. Cramer's coefficient which is computed from chi-square coefficient was sometimes used to clarify the degree of correlation between a factor and sport behavior.

Meanwhile, when we consider an interrelation between variable X and sport behavior Y by simple correlation coefficient, true correlation may sometimes be undistinguishable from apparent one. On some occasions, this may reach an erroneous conclusion. In this sense, a statistical method using cross analysis and simple correlation coefficient is limited explaining sport behavior which is considered to be related to various factors simultaneously.

In recent years, multivariate analysis which can deal with many variables at the same time has been receiving much attention. Especially, Hayashi's quantification theory, one kind of that, is adopted most frequently. This theory has originated from Guttman's theory for attitude measurement and has been developed by Hayashi²⁰⁾. In this technique, qualitative variables also can be analyzed as quantitative ones simultaneously. There are two cases in quantification theory, one case has an external criterion which should be distinguished and the other case has not. The former is to clarify a relation between explanatory variables X and external criterion Y and to describe or predict Y by X, and it has two types, I and II. On the other hand, the latter is to classify the variables X or the research subjects and to examine a structure of interrelation or similarity among X, and this has also two types, III and IV.

As Table 1 shows, Hayashi's quantification theory II was adopted most often in the studies. This technique was adopted by Nagayoshi et al.¹⁹⁾ for the first time in the field of study on the factors determining sport behavior. Then, we would like to point out some problems in the case of using this technique. Firstly, quantification theory is a complete operational and functional statistical model and its results would vary according to the number and contents of the explanatory variables, and one must take care not to overgeneralize the results. Secondly, it indicates relational structure among variables X but it does not show a structure of cause and effect between X and behavior Y. Therefore, strictly speaking, we presume the determinants from relational structure of X and Y. Thirdly, when the number of sample or response to categories of variable is small, over numerical value may be given to the variables at times. Therefore, we should estimate the explanative degree of variables to behavior after confirming the number of response. Finally, the numerical value given to categories of variable may show reverse direction to the result of cross tabulation. In such a case, it would be necessary to analyze again after adding samples or integrating categories of the variable.

Summary

We have taken up eighteen papers presented as studies on the factors determining people's sport behavior in Japan and examined them concerning three points, definition of sport behavior, selection of explanatory variables and analytical technique of the data. We did not introduce the contents and results of these papers, because the focus of our study was limited to the methodological problems. The results of the present study can be summarized as follows:

1. In this kind of study, it is necessary to consider both sport behavior as a dependent variable and an explanatory variable, however, much attention has been paid to selection of explanatory variables.
2. The greater part of the studies have defined sport behavior from quantitative aspects. The qualitative aspects such as contents, purpose, level of skill and characteristics of sport have never been considered as much. Hereafter, since it is expected that people's sport involvement will become more varied and more complicated, the definition of sport behavior from various aspects will become necessary.

3. A sufficient theoretical model or framework of research for selection of explanatory variables has not been presented. Concerning this point, we have presented our tentative model for sport behavior. It is important to make such a theoretical model and to clarify the useful factors which can be generalized for the explanation of sport behavior.
4. As for analytical technique of the data, cross analysis, analysis using correlation coefficient, quantification theory, multiple regression analysis, analysis of variance and stepwise multiple regression and path analysis were adopted. At present, the quantification theory II has been adopted most frequently. This technique is a complete operational statistical model, and its results would vary according to the number and contents of the explanatory variables. So, we should take care not to overgeneralize the results. It is also important to use suitable analytical technique in accordance with the purpose of the study after understanding the meaning and the problems of analysis.

(The part of this study was presented at Seoul Olympic Scientific Congress, Seoul, in 1988.)

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