The Effects of Sports Activities on Time Preferences and Risk Aversion

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Abstract

This paper investigates whether sports experience changes adolescents' preferences. For this purpose, we conducted a survey of Japanese university students about their sports experiences, time preferences, and risk aversion. Our regression analysis shows that students' sports experience does not significantly change their time preferences or risk aversion. This result implies that although students devote a lot of time to sports in Japan, sports still do not have a significant impact on students' attitudes towards time and risk.

Keywords: Sports Experience, Time Preferences, Risk Aversion, Student Survey

JEL: Z20, D81, D91, I21

1. Introduction

Sports are popular among adolescents in Japan, including junior high school, high school, and university students. In Japan, each school provides opportunities for students to participate voluntarily in "club activities." Club activities typically use school facilities and are held before or after school hours. Students are free to choose whether or not to participate in club activities, but survey results show that many junior and senior high school students do participate in club activities.[2] Club activities are divided by sport, and schools offer several types of sports, such as soccer, basketball, and tennis.

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[2] According to "Houkago no Seikatsu Jikan Chousa (Survey on after-school time use)" conducted by Benesse in 2008, approximately 70% of junior high school students and approximately 60% of high school students participate in club activities, and of these, more than 60% belong to sports clubs.

The high participation rate in club activities means that Japanese adolescents devote a lot of time to sports, so they may be greatly influenced by sports. For example, sports may have psychological effects on adolescents, such as helping them realize the difficulty of attaining goals, the importance of teamwork, and the value of hard work. Moreover, sports may have the potential to change adolescents' attitudes toward time and risk.

Based on the above considerations, we conducted a survey of university students. We asked them questions to measure their time preferences and risk aversion. We also asked about their sports experience. Using the results of this survey, we tested the hypothesis that sports influences adolescents' preferences, particularly their time preferences and risk aversion.[3]

According to our regression analysis, contrary to our hypothesis, sports experience has no significant effect on either the time preferences rate or the degree of risk aversion. This fact seems surprising considering that many adolescents devote a lot of their time to, and are influenced by, sports activities. There are various possible reasons for this. It is possible that studying has a greater impact on human preferences than sports activities. It is also possible that people's innate attitudes towards time and risk do not change easily depending on the environment they belong to. We would like to verify the details on another occasion.

Economics typically analyzes how differences in preferences, such as time preferences and risk aversion, affect economic behavior and human behavior more broadly. Here, preferences are considered the cause and behavior the result. However, in recent years, there has been an increase in research attempting to clarify what factors determine preferences.[4]

This study is related to the following two research streams. First, it is related to a series of studies

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[3] Sports is a world where the results of practice are not immediately apparent, and it is thought that sports make people more patient. Furthermore, sports are an uncertain world in which practice and results do not always match, so sports can potentially make people less risk-averse. In other words, we can hypothesize that sports experience reduces young people's time preference rate and the degree of risk aversion.

[4] In this study, we also consider sports experience as the cause and preferences as the result.

analyzing what factors determine the preferences of young people.[5] Second, it is related to studies that focus on the relationship between sports and preferences.

Eckel et al. (2012) focus on the impact of educational quality, such as class size, in schools. They show that teens in schools with larger average class size are relatively more risk averse. That study, like the present study, takes the position that individual preferences are endogenous and develop over time. Moreover, Andreoni et al. (2020) focus on adolescent risk preferences. Experiments in that study show that adolescent females are more risk averse than adolescent males. However, there was no gender gap among younger people, suggesting that differences in risk attitudes between boys and girls emerge during adolescence.

Similar studies analyzing adolescent risk aversion include Harbaugh et al. (2002), Borghans et al. (2009), Booth and Nolen (2012), Cárdenas et al. (2012), Khachatryan et al. (2015), Piovesan and Willadsen (2021), and Zhang et al. (2025).

Regarding adolescent time preferences, the following studies exist, although the causal relationship is reversed from the present study. Golsteyn et al. (2014) show a substantial adverse relationship between high discount rates and school performance, health, labor supply and lifetime income. Castillo et al. (2019) show that children who have a higher discount rate are less likely to graduate from high school.

Moreover, experimental studies that focus on both adolescent risk aversion and time preferences are Sutter et al. (2013), Tymula (2019), Samek et al. (2021) and Horn et al. (2022).

Next, this study is related to studies that focus on the relationship between sports and preferences. Krumer et al. (2011) show that professional athletes have a higher rate of time preferences compared to non-athletes. Bleichrodt et al. (2018) show that professional athletes are more optimistic compared to non-professional athletes.

This paper is structured as follows. In Section 2, we clarify our hypotheses about the relationship between sports experience and time preferences, and between sports experience and risk aversion.

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[5] An example of the survey is Sutter et al. (2019).

In Section 3, we explain the survey conducted and how we measure sports experience, time preferences, and risk aversion. In Section 4, we consider the data. In Section 5, we present the results and give an interpretation. Section 6 is a summary and conclusion.

2. Time Preferences and Risk Aversion

Time preferences and risk aversion are the most important preferences considered in economics. In this study, we examined whether sports experience influences these two preferences of adolescents. In this section, we will explain our hypotheses regarding the influence of sports experience.

Time preferences measure how much a person prefers present pleasure over future pleasure, or conversely, how much a person discounts future pleasure compared to the same level of current pleasure. A high rate of time preferences means that one prefers current pleasure over future pleasure and is therefore impatient. On the other hand, a low rate of time preferences means that one does not care about realizing current pleasure and is therefore patient.

Risk aversion is how much a person dislikes risk. High risk aversion means that one strongly dislikes risk and prefers guaranteed income to gambling. In this case, even if gambling can achieve the same expected value as guaranteed income, an additional amount of money is needed to achieve the same level of satisfaction as guaranteed income. On the other hand, low risk aversion means that one does not dislike risk very much. In this case, the additional amount approaches 0.

We examined the possibility that sports can change students' time preferences and risk aversion. Sports is a long-term world, where the results of practice do not appear immediately. By continuing to practice sports, people may realize this and not desire immediate results. Therefore, sports may make people more patient. At the same time, sports is an uncertain world, where the results of every game do not necessarily match those of practice. By participating in many games, people may understand this and be more willing to accept risk. Taking these into consideration, we propose the following hypothesis: People who continue to practice sports for a long time may become more patient and have a lower rate of time preferences. In addition, through participation in games, they may become less risk averse.

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3. Survey

To measure students' time preferences and risk aversion, we conducted a survey of students at Shobi University in 2023.[6] The survey also includes questions about students' sports experience and other characteristics.

Table 1. Distrubutions of respondents			
	Male	Female	Total
1st year	105	39	144
2nd year	59	20	79
3rd year	7	0	7
4th year	6	0	6
Total	177	59	236

Table 1 shows the distribution of the sample by gender and by grade. The total number of samples used for the analysis is 236.[7] Males account for about 3/4 of the total, and females about 1/4. In addition, first-year students account for 60% of the total, and second-year students account for 30%. The reason for the bias towards the grade level of the respondents is that the classes in which the survey was conducted are aimed at younger students.

Below are four of the most important questions that were asked to the students. All were asked in Japanese, but were translated into English by the author.

To understand students' sports experience, we asked two questions in the survey. The first question asks about the length of sports experience each student has.

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[6] This survey was conducted with permission from Shobi University.

[7] The total number of people who answered the questions is 246. Of these, 10 people are not included in the analysis because they gave unmotivated answers, such as giving the same answer to different questions. This process was checked by both the survey administrator and the author.

Question 1 (Sports Experience 1): In total, how many years do you think you have been actively involved in sports in your life?

We have another question to ask about each student's sports experience. In Japan, most students participate in "club activities" at school and have many sports experiences. Clubs are created within schools and are divided into different types of sports, such as baseball and tennis. Club activities are not compulsory, but many students participate in them voluntarily. Therefore, their sports experience tends to correlate with their club activities at school. The next question focuses on each student's club activities at school and asks about their sports experience.

Question 2 (Sports Experience 2): How many years in total have you been involved in sports as part of a club activity at school (junior high school, high school, university)?

We created two variables, S1 and S2, representing the amount of sports experience from the answers to the two questions above. Since both of these variables represent the amount of sports experience, it is expected that the impact of both variables on students will be similar.

Table 2. Distribution of sports experience					
	1-5 years	6-10 years	11-15 years	16-20 years	Total
Years of sports activities	24	102	86	22	234
Years in club activities	35	162	30	5	232

Table 2 shows the distribution of years of sports experience S1 and S2. As can be seen from this table, for Question 1, those who answered "6 to 10 years" accounted for almost half of the total. The same results were obtained for Question 2. The results show that many respondents participated in sports activities (club activities) during their three years of junior high school and three years of high school.

The following questions were asked to assess students' time preferences and risk aversion.[8] These

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[8] The reason this study attempts to measure time preferences and risk aversion based on questionnaires rather than experiments is because our resources and environment did not allow us to conduct experiments.

questions are original, but are questions that anyone in economics would naturally come up with. In this study, taking into consideration that the students had not studied economics, the questions were made as simple as possible so that they could understand.

Question 3 (Time Preferences): You tried to get 100,000 yen from someone you trust (such as a parent), but that person told you, "I can't give you 100,000 yen right now, but if you wait a year, I can give you more than 100,000 yen." What amount would you need to receive one year from now to be as satisfied as receiving 100,000 yen right now? Please answer the amount you think it would be.

Question 4 (Risk Aversion): You tried to get 100,000 yen from someone you trust (such as a parent), but that person told you, "I can't do that, but if you participate in a game and win, I'll give you the winnings from that game." The game is one in which you flip a coin, and if the coin lands on heads, you receive a prize, and if the coin lands on tails, you receive no money. In other words, if you participate in the game, you have a 50% chance of receiving a prize. What amount of prize money would you need to receive to give you the same satisfaction as receiving 100,000 yen with certainty? Please answer the amount you think it would be.

We created a variable T from the students' answers to Question 3 and a variable R from the students' answers to Question 4.

From the way Question 3 is asked, variable T represents the time preference rate. The higher the value of T, the greater the compensation needed for waiting. People with a high value of T are less patient and have a high time preference rate. Conversely, people with a small value of T, close to the current amount, consider future money to be almost the same as present money. The latter can be said to find the cost of waiting small and to be patient. In other words, such people have a low time preference rate.

From the way Question 4 is asked, variable R represents the degree of risk aversion. The higher the value of R, the greater the amount of compensation required when there is a risk. In other words, people with a high value of R are more risk averse.

Table 3. Distribution of respondents' preferences						
	Less than 100,000 yen	100,000 yen to less than 200,000 yen	200,000 yen to less than 1 million yen	1 million yen to less than 10 million yen	10 million yen or more	Total
Time Preference	17	92	82	18	7	216
Lisk Aversion	30	92	63	26	6	217

Table 3 divides the responses to Questions 3 and 4 into five groups: 1) less than 100,000 yen, 2) 100,000 yen or more but less than 200,000 yen, 3) 200,000 yen or more but less than 1 million yen, 4) 1 million yen or more but less than 10 million yen, and 5) 10 million yen or more. In this table, no response or responses of 0 yen are excluded.

The respondents are not necessarily students of economics, so some of them gave inappropriate answers to Questions 3 and 4. As can be seen from this table, in both questions, there are respondents who gave very small responses (less than 100,000 yen) and very large responses (10 million yen or more). In the next section, we explain how these responses are handled in this study.

4. Data Issues

As mentioned in the previous section, in Question 3, which asked about time preferences, and Question 4, which asked about risk aversion, some respondents gave very small values and some respondents gave very large values. Before we begin our empirical analysis, let us explain our policy for using the data.

Regarding Question 3

First, we will examine the answers to Question 3 regarding the time preference rate. In this question, 17 people answered less than 100,000 yen, excluding 19 people who answered 0 yen or did not answer. However, this answer is not appropriate because, generally speaking, it is unlikely that an amount of less than 100,000 yen a year from now will bring the same level of satisfaction as 100,000 yen now.

In our study, we address this issue by conducting both estimations including and excluding those who answered less than 100,000 yen. However, when drawing the scatter plot, we do not exclude

the 17 people who answered less than 100,000 yen.

Next, we also think it problematic when the response value was too large. In fact, seven respondents answered 10 million yen or more, and the largest answer was 50 million yen. If we use the raw numerical values in the estimation, the estimation results will be biased by a small number of such answers.

There are many ways to address this issue, but we consider a certain upper limit value and replace answers greater than that value with that upper limit value. However, this method raises the issue of what the upper limit should be. In this study, the upper limit is set at 10 million yen, and any value greater than 10 million yen is treated as 10 million yen. This is because it is highly unlikely that an amount greater than 10 million yen one year from now would provide the same level of satisfaction as 100,000 yen now, so an answer greater than 10 million yen is not appropriate.

The reason why the method of dealing with extremely small answers and extremely large answers is different is that the former is thought to be due to a lack of understanding of the question, while the latter is thought to be due to a strong preference for the present, rather than a lack of understanding. Therefore, in the latter case, we do not take a measure to exclude extremely large answers.

In the regression analysis of time preferences, we conduct the following four estimations: A) An estimation using all samples, but correcting answers greater than 10 million yen to 10 million yen. S1 is used as the explanatory variable representing sports experience. B) An estimation not using those who answered less than 100,000 yen, and correcting answers greater than 10 million yen to 10 million yen. S1 is used as the explanatory variable representing sports experience. C) S2 is used as the explanatory variable representing sports experience, but otherwise it is the same as Estimation A. D) S2 is used as the explanatory variable representing sports experience, but otherwise it is the same as Estimation B.

Regarding Question 4

In Question 4, some respondents gave very small values and some gave very large values, but both are considered problematic from an economic perspective. The treatment of Question 4 is almost

the same as that of Question 3.

First, in this question, the amount assumed to be received with certainty is 100,000 yen. Therefore, even if the respondent likes gambling, it is difficult to imagine that a situation in which there is a 50% chance of receiving an amount less than 100,000 yen would be as satisfying as a situation in which they would receive 100,000 yen with certainty. However, even if we exclude the 18 respondents who answered 0 yen or did not answer, 30 people answered less than 100,000 yen. We believe that the reason for such answers is that they do not understand the meaning of the question at all, rather than that they like gambling very much.

Taking the above into consideration, we set the lower limit of the answer to 100,000 yen and conduct both estimations including and excluding the respondents who answered less than 100,000 yen. However, in order to get an overall image, we keep these respondents when drawing the scatter plot.

Next, in this question, the number of people who answered more than 10 million yen was 6. However, it is hard to imagine that a situation in which there is a 50% chance of receiving an amount greater than 10 million yen would be as satisfying as a situation in which there is a 100% chance of receiving 100,000 yen. The reason for giving such a large answer to Question 4 is thought to be that it represents a strong aversion to gambling, but even so, we believe that a value that is too large cannot be considered a correct answer.

Taking the above into consideration, we set the upper limit of the answer to 10 million yen, and the answer of those who answered a value greater than 10 million yen to 10 million yen. In the regression analysis of risk aversion, we conduct four estimations, just as we do in the regression analysis of time preferences.

Therefore, in the regression analysis of both time preferences and risk aversion, the lower limit of the value is set at 100,000 yen and the upper limit is set at 10 million yen. Responses below the lower limit are deemed to indicate a lack of understanding of the question and may be excluded, whereas responses above the lower limit are deemed to indicate strong preference for the present or strong risk aversion and are modified rather than excluded. However, we have confirmed that these modifications do not change our main results.

5. Analysis

In this section, we will draw scatter plots and conduct a regression analysis to verify whether our hypothesis holds. Our main result is that, contrary to our hypothesis, sports experience does not affect students' time preferences or risk aversion. The important variables used in both the scatter plot and regression analysis are: S1 and S2, representing the number of years of sports experience, and T and R, representing students' time preferences and risk aversion, respectively.

Scatter Plots

The scatter plots below show the overall trends among the important variables. Figure 1 shows the relationship between variables S1 and T, and Figure 2 shows the relationship between variables S2 and T. Figure 3 shows the relationship between variables S1 and R, and Figure 4 shows the relationship between variables S2 and R.

Figure 1. Relationship between year of sports activities and time preferences
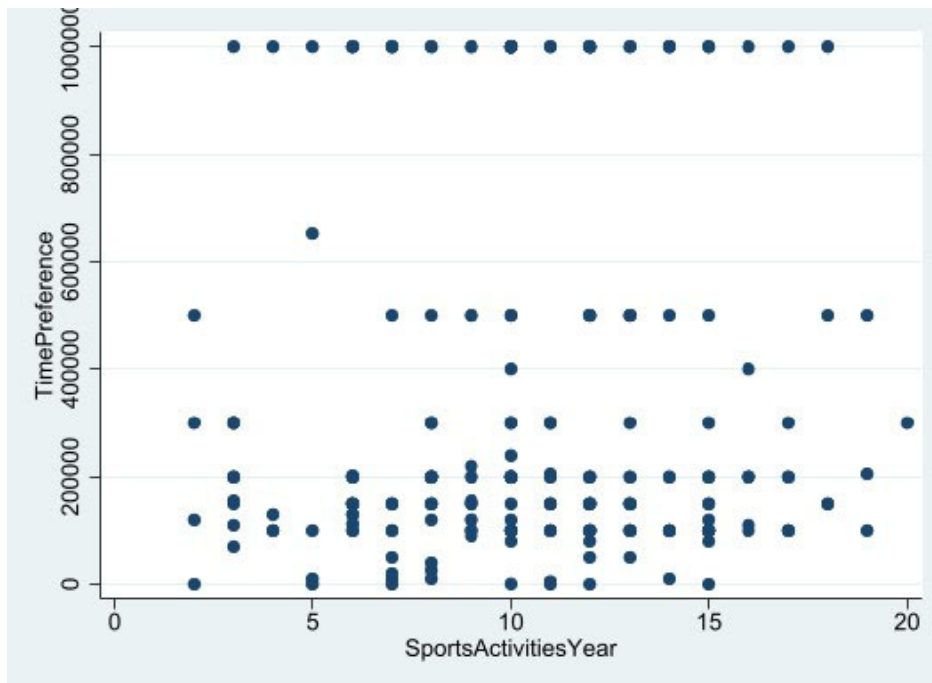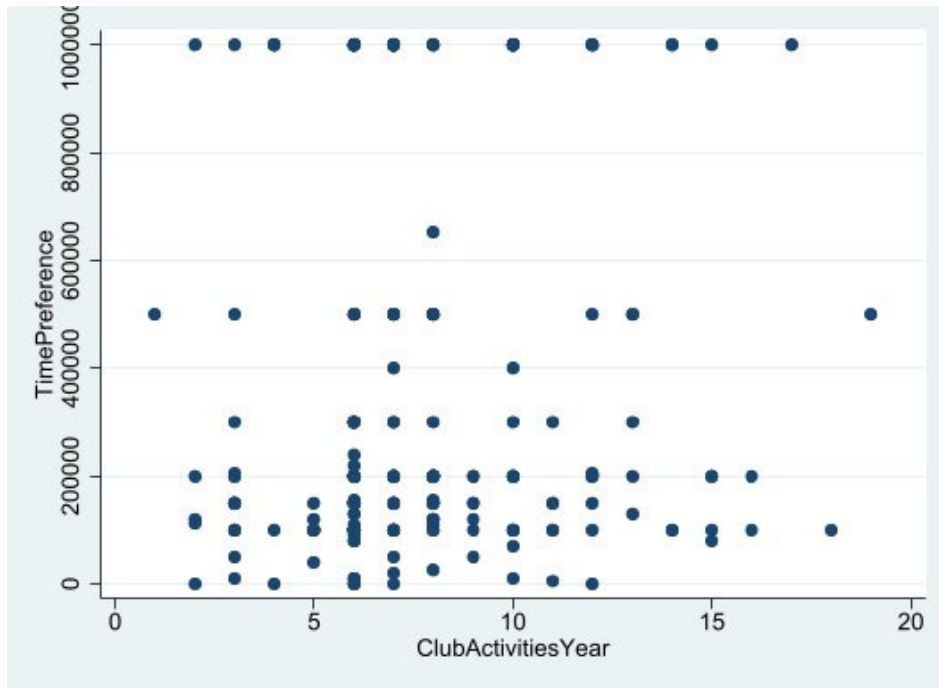
Figure 2. Relationship between year of club activities and time preferences

In Figures 1 and 2, the vertical axis represents years of sports experience and the horizontal axis represents the time preference rate, or how much one prefers the present. According to the hypothesis, as sports experience increases, the degree to which one prefers the present decreases, that is, the time preference rate decreases. However, as the figures show, there seems to be no relationship between the length of sports experience and the time preference rate. In other words, the time preference rate does not seem to change even if the length of sports experience increases.

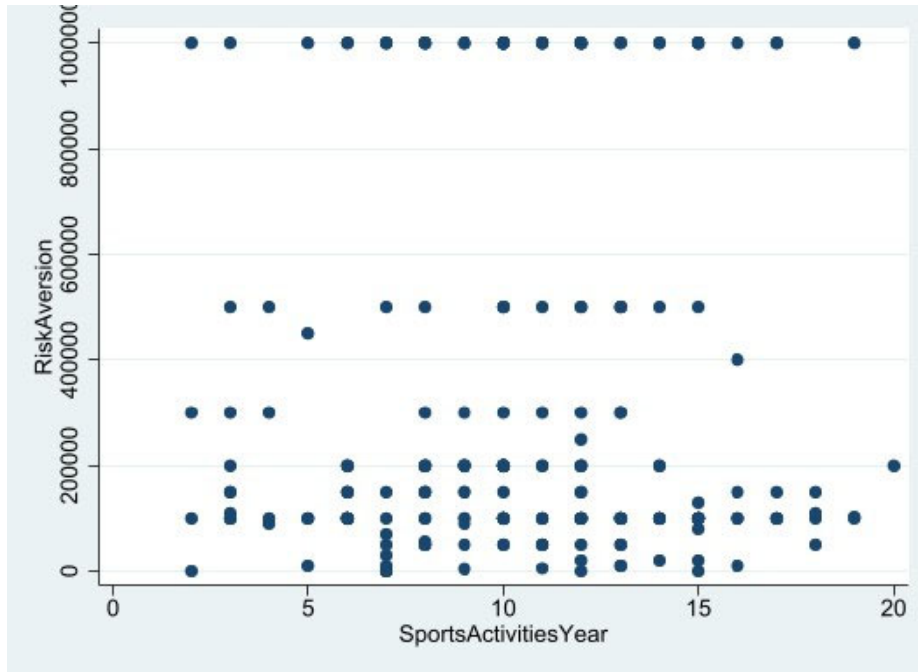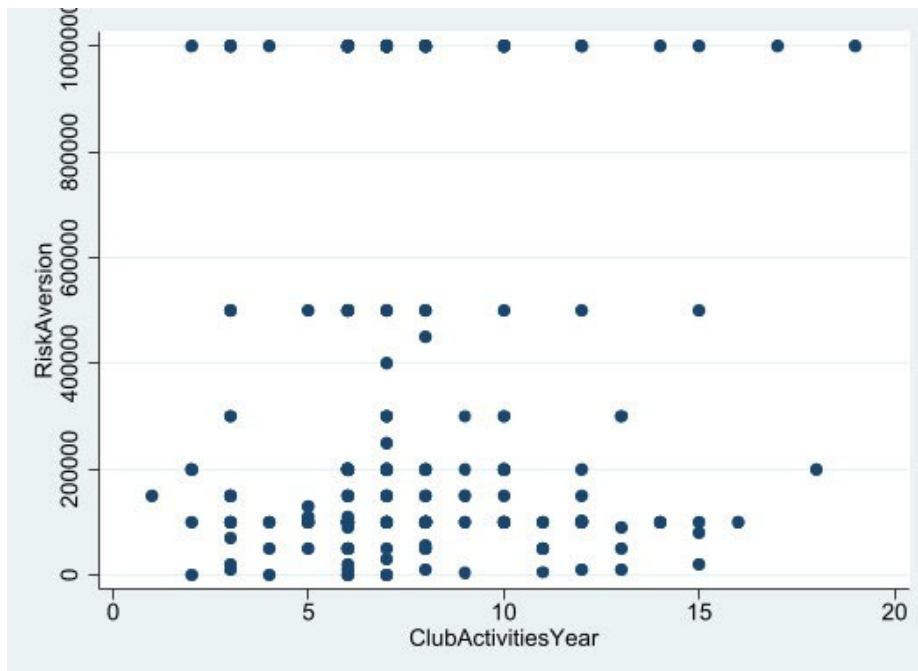Figure 3. Relationship between year of sports activities and risk aversion

Figure 4. Relationship between year of club activities and risk aversion

In Figures 3 and 4, the vertical axis represents years of sport experience, and the horizontal axis represents the degree of risk aversion, or how much one dislikes risk. According to the hypothesis, as sports experience increases, the degree to which one dislikes risk decreases, that is, the degree of risk aversion decreases. However, as shown in Figures 3 and 4, there seems to be no relationship between the length of sports experience and the degree of risk aversion. In other words, the degree of risk aversion does not seem to change even if the length of sports experience increases.

Regression Analysis

In order to more accurately confirm the general trends observed in the scatter plots, we conduct the regression analysis below. The estimation equation is:

$$Dependent_j = a + b_1 Sports_j + b_2 Female_j + b_3 Grade_j + b_4 Income_j$$
$$+ b_5 Parents_j + b_6 Econ_j + b_7 X_j + e_j \qquad (1)$$

In this equation, the dependent variable $Dependent_j$ is either variable T or variable R, where j represents each student. The variable T represents time preferences, and the variable R represents risk aversion. On the other hand, the main explanatory variable $Sports_j$ is either S1 or S2. The variable S1 represents the number of years of sports experience, while the variable S2 represents the number of years of club activities. Moreover, e_{jt} is an error term.

We adopt the following as additional explanatory variables: The variable $Female_j$ is a dummy variable that takes the value 0 for men and 1 for women. The variable $Grade_j$ represents the student's grade, with 1 for first-year students, 2 for second-year students, 3 for third-year students, and 4 for fourth-year students. The variable $Income_j$ represents the respondent's income and uses the answer value to the question: "How much do you earn on average per month?" The variable $Parents_j$ is a dummy variable indicating whether the respondent lives with their parents, taking the value 1 if the respondent lives with their parents and 0 otherwise. The variable $Econ_j$ is a dummy variable indicating whether the respondent has taken economics at university, taking the value 1 if they have taken it and 0 if they have not.

Furthermore, in Equation (1), X_j is a vector of dummy variables that represent the respondent's

thoughts. It is made up of five dummy variables that represent the respondent's personal thoughts that are likely to be related to time preferences and risk aversion. Each dummy variable takes the value 1 if the answer to each question is "yes" or 0 if the answer is "no." 1) The variable $Study_j$ is created from the following question: "Studying at university is enjoyable." 2) The variable $Stress_j$ is created from the following question: "Currently, I lead a stressful life." 3) The variable $Future_j$ is created from the following question: "I think Japan's economy will improve in the future." 4) The variable $Independence_j$ is created from the following question: "I would rather work independently than become a company employee or civil servant." 5) The variable $Promotion_j$ is created from the following question: "I would like to get promoted and become important in the company."

Our estimation results are presented in Tables 4 and 5. In the estimation of Table 4, the dependent variable is T, i.e., the time preference rate, while in the estimation of Table 5, the dependent variable is R, i.e., the degree of risk aversion. All estimations are by OLS.

Table 4. Results on time preference rates	A	B	C	D
S1	238.8	-1197.2		
	(5121.4)	(5328.9)		
S2			7142.5	6423.8
			(6690.2)	(7048.9)
Female	-48430.0	-55313.8	-46260.1	-53438.1
	(48069.5)	(50573.5)	(48758.6)	(51453.0)
Grade	-82875.7***	-80071.0**	-84866.8***	-82215.6**
	(31133.8)	(32841.1)	(31712.1)	(33596.7)
Income	-0.185	-0.211	-0.171	-0.197
	(0.262)	(0.268)	(0.264)	(0.270)
Parents	-50009.8	-27425.5	-54999.3	-33025.6
	(48654.9)	(50171.1)	(49791.0)	(51394.3)
Econ	83842.3*	86886.3*	78617.6*	81293.6
	(46197.2)	(48731.2)	(46761.4)	(49316.5)
Study	-25062.9	-16236.8	-27224.7	-20445.1
	(42578.3)	(44914.4)	(43281.9)	(45668.2)
Stress	83350.7*	76938.0*	93343.8**	86595.0*
	(42336.0)	(44438.6)	(43162.6)	(45298.7)
Future	26289.4	22951.7	20935.1	18555.0
	(43283.6)	(45841.0)	(44290.1)	(46970.8)
Indepence	21600.3	22571.7	20444.6	20837.8
	(41020.6)	(43548.9)	(41561.6)	(44146.1)
Promotion	55142.7	45624.4	53305.9	45266.4
	(44807.0)	(47688.5)	(45403.7)	(48429.2)
Constant	343183.9***	359057.9***	304118.7***	311569.6***
	(94401.5)	(98863.0)	(96388.3)	(101002.3)
N	207	192	204	189
R2	0.086	0.080	0.094	0.087
The dependent variable is the time preference rate.				
Standard errors in parentheses				
The significance level of each coefficient is expressed as follows:				
* p<0.1, ** p<0.05, *** p<0.01.				

Table 5. Results on risk aversion				
	A	B	C	D
S1	805.1	410.1		
	(5645.2)	(6019.3)		
S2			-4365.6	-1613.8
			(7320.2)	(8175.3)
Female	-63662.9	-76872.1	-74854.3	-86165.5
	(53131.0)	(57293.3)	(53826.4)	(58070.2)
Grade	-94492.4***	-101218.0**	-93672.1***	-101916.3**
	(34338.4)	(39271.2)	(34942.0)	(40368.9)
Income	-0.0534	-0.0133	-0.0598	-0.0113
	(0.289)	(0.300)	(0.290)	(0.302)
Parents	-118137.3**	-113020.5*	-126276.3**	-121812.7**
	(53288.1)	(57257.6)	(54417.3)	(58498.3)
Econ	124653.5**	162271.4***	123303.1**	159308.2***
	(51345.7)	(56097.4)	(51903.8)	(56599.7)
Study	-10179.1	866.2	-14854.7	-5392.5
	(47098.1)	(52436.1)	(47862.4)	(53304.0)
Stress	34675.5	21722.0	44115.6	35042.4
	(46717.8)	(51008.2)	(47515.4)	(51958.3)
Future	-17422.1	-25730.7	-16235.4	-26768.6
	(47679.0)	(52286.8)	(48791.8)	(53641.7)
Indepence	17033.3	29209.7	20588.7	33237.5
	(45212.4)	(49896.4)	(45742.5)	(50562.9)
Promotion	34074.6	31309.2	37852.8	34904.9
	(49431.5)	(54734.9)	(50085.7)	(55474.5)
Constant	413528.4***	430615.1***	463090.8***	458831.5***
	(103721.6)	(109206.2)	(105289.3)	(112926.3)
N	208	181	205	178
R2	0.087	0.102	0.094	0.110
The dependent variable is the degree of risk aversion.				
Standard errors in parentheses				
The significance level of each coefficient is expressed as follows:				
* p<0.1, ** p<0.05, *** p<0.01.				

Each table consists of Estimations A to D. In Estimations A and B, the main explanatory variable is S1, which represents the number of years of sports experience, while in Estimations C and D, the main explanatory variable is S2, which represents the number of years of club activities. Both variables are expected to have a similar effect.

The difference between Estimations A and B, and between Estimations C and D, is the samples used for the estimation. Estimations A and C use the entire sample. As mentioned above, Estimations B and D exclude respondents who answered values smaller than the lower limit of 100,000 yen in Questions 3 or 4. For all estimations, the upper limit of variables T and R is set to 10 million yen, and any higher responses are adjusted to 10 million yen.

First, we consider the case where the dependent variable is T (Table 4). In this case, we are considering how sports experience affects the time preference rate. If the coefficient of the explanatory variable S1 or S2 representing sports experience (b_1) is negative, then it means that sports experience has reduced the time preference rate. In this case, it can be said that people have become more patient through sports experience. If our hypothesis is correct, this will be true. Table 4 shows that in all estimations, the coefficients representing sports experience (b_1) are not statistically significant. This means that students' time preferences are not affected by years of sports experience.

Next, we consider the case where the dependent variable is R (Table 5). In this case, we are considering how sports experience affects the degree of risk aversion. If the coefficient of the explanatory variable S1 or S2 representing sports experience (b_1) is negative, then it means that sports experience has reduced risk aversion. In this case, it can be said that through sports experience, people have become less risk averse. If our hypothesis is correct, this will be true. Table 5 shows that in all estimations, the coefficients representing sports experience (b_1) are not statistically significant. This means that students' risk aversion is not affected by years of sports experience.

In summary, the results of the regression analysis show that students' sports experience does not affect their time preferences or risk aversion. This means that our hypothesis does not hold. Japanese students devote a lot of time to sports. Nevertheless, individual preferences seem to be

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unrelated to such sports activities.

Finally, as Tables 4 and 5 show, other explanatory variables have little significant effect on either time preferences or risk aversion. This implies that time preferences and risk aversion are determined independently of an individual's environment and thoughts. Exceptionally, as a student's grade increases, time preferences and risk aversion decrease, while taking economics classes increases time preferences and risk aversion. Furthermore, stress increases only time preferences, while living with parents decreases risk aversion.

6. Conclusion

We examined whether sports experience changes adolescents' preferences. For this purpose, we surveyed college students to find out about their sports experience, time preferences, and risk aversion. The results of the regression analysis show that students' sports experience does not change their time preferences or risk aversion. This means that although students devote a lot of time to sports, sports still do not have a significant impact on their attitudes towards time and risk.

Although our conclusions appear to be robust, this study has several limitations. First, it is difficult to increase the sample size due to the complicated procedures for conducting surveys at Japanese universities. This issue may have affected our estimation, but we believe that our main result would not change even if the sample size were increased. Second, it is possible that some students did not understand the meaning of the question. This problem seems unavoidable given that many students have not taken economics classes. Therefore, we verified that the main result does not change even if we remove samples with unnatural answers. Finally, the number of explanatory variables in the regression analysis is not so large. This is because there are privacy issues in universities and there are limitations on what we can ask students. For example, we could not ask students about their GPA because it may invade their privacy.

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