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Does physical exercise affect tradeoffs between fixed pay and performance-related pay for individuals?

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Abstract

Much of the literature on performance-related pay has discussed the relationships with risk attitude, job satisfaction, sorting effects, amongst other factors. This paper focuses on the relationship between individual preferences for physical exercise or sports and the tradeoff between fixed and performance-related pay. First, a choice experiment is used to identify the individual preference for payments, and the tradeoff between fixed and performance-related pay. Next, OLS regression models are used to link the tradeoff with individual preference for physical exercise or sports. The results show that such a preference has a positive and significant influence on individuals' tradeoff of payments. For individuals who like physical exercise or sports more, who are better at them, and who take part in them more frequently, are more likely to prefer performance-related pay.

Keywords: physical exercise; sports; fixed pay; performance-related pay; tradeoff

JEL Classification: C35, J33, Z22

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1. Introduction

"*Every man's work, whether it be literature or music or pictures or architecture of anything else, is always a portrait of himself.*"

--*Samuel Butler*[1]

The preference for payments can be seen as a portrait of oneself, showing people's potential taste.

Nowadays, flexible payment systems have become a central topic at firms. Generally, there are three types of payment given to employees by firms: pure fixed, pure performance-related, and mixed, combining fixed and performance-related, payments (Shen et al., 2014). For the first, employees only receive fixed salaries without any flexible bonus. For the second, also called piece-rate payment, employees' salaries are dependent on their outputs. The third is a combination of the first two in that a part of employee salaries is fixed and the rest is determined by their outputs. These three kinds of payments each have advantages and disadvantages. The fixed payment is stable, but too stable to make more money. The performance-related payment can encourage employees to work more and obtain more: however, it provides no stability and can be stressful to employees. Yeh et al. (2009) showed that employees under a performance-based system have the longest working time, highest level of job control, and highest percentage of employees who endured high stress at work. The mixed payment has both the merit and demerit of the other two payments. Given that the preferences for payment schemes differ between individuals, firms need to know which scheme their employees prefer. A suitable scheme that can maximize each employee's utility, and consequently his/her output, is not only welcomed by employees but also profitable for firms.

The individuals' preference for payment schemes is usually unobservable and hard to measure. However, some aspects of individuals' preference and/or behavior that might reveal their preferred payment schemes are relatively easy to observe and measure. Therefore, discovering these aspects is extremely important for both academics and practitioners designing employee preferred payment schemes.

Much of the existing literature has discussed the relationship between payment schemes and some individual attributes, such as risk preference, and job satisfaction, amongst other things. Performance-related pay is always the focus of this literature. Performance-related pay has been proved to increase employees' productivities and earning (Booth & Frank, 1999; Lazear, 2000; Lemieux et al., 2009). Some studies have pointed out that besides increasing the productivity of employees, performance-related pay can also create a sorting effect that helps firms to attract more productive and high-ability employees (Lazear, 1999; Origo, 2009; Stefanec, 2010).

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[1] Samuel Butler was a Victorian-era English author and novelist.

Given that most people have different risk preferences, their preferences for the payment system per se and the magnitude of the tradeoff between fixed pay and performance-related pay should be different. It has been pointed out that risk lovers prefer performance-related payment, and risk averse individuals value fixed payment more highly (Shen et al., 2014). Further, Leonard et al. (2013) showed that greater tolerance of financial risk, and more patient time preferences[2], among low-income ethnic minority population are linked with greater physical fitness. Moreover, women are less risk loving than men, and women in permanent jobs are more risk loving than women in temporary ones (Mauro & Musumeci, 2011). People's risk preferences are changeable according to the nature of the performance-related payment. Kuhn & Yockey (2003) indicated that performance-related payment is more often preferred by employees when the salary depends on individual rather than collective or team performance and employees are more optimistic about the likelihood of getting the performance-related pay as individuals.[3]

With respect to job satisfaction, Green (2004) pointed out that performance-related pay may decrease job satisfaction for work intensification. However, Green & Heywood (2008) found no evidence supporting Green's point. Their result demonstrated that performance-related pay tends to increase overall job satisfaction. In addition, Cornelissen et al., (2011) found that before controlling for earnings, employees under the performance-related payment scheme have higher job satisfaction than others, but after controlling for earnings, employees in jobs with performance-related pay have the same job satisfaction as those not in such jobs.

In this study, we consider that physical exercise and sports may, to some extent, reveal people's preference for payment schemes. Physical activities are important for everybody's health. Physical inactivity has been proved to be a potential factor increasing premature mortality and numerous adverse chronic health conditions. Increased blood pressure, coronary heart disease, type-II diabetes, certain types of cancer, gallbladder disease, musculoskeletal disorders, obesity, osteoporosis, and obstructive sleep apnea are just some consequences frequently mentioned (Stamatakis et al., 2007). What's more, the preference of doing physical exercise not only affects one's health, but also has an impact on employment and earnings. Generally, the effects of doing physical activities may make people look fitter and attractive, which have been shown to increase employment and earnings, and a healthy body can help to increase individual efficiency (Lechner, 2009). Additionally, people may link someone who likes exercise or sports with responsibility, discipline, competition, leadership, and teamwork

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[2] Time preference is the inclination of a consumer towards current consumption over future consumption. Having a high time preference means that he or she prefer current consumption rather than future consumption, and vice versa.

[3] There is one limitation on the application of the performance-related pay in firms despite its incentive and sorting effects. Eriksson & Villeval (2008) pointed out that the performance-related pay might expand the wage difference among employees and increase team heterogeneity within firms, which would generate conflicts between employees, destroy morale, kill teamwork, and hurt the output. As a result, it is less likely to be applied in firms reliant on a high level of.

(Pfeifer & Cornelissen, 2009). In a word, doing physical exercise could increase employment opportunities and earnings, and the higher the frequency the greater the probability of employment (Kavetsos, 2011). Regarding the relationship between the preference for payments and exercise, Ewing (1998) provided related evidence using the 1990 wave of the National Longitudinal Surveys of Youth (NLSY) data set. He found that former high school athletes are more willing to be employed in jobs under a performance-related payment system. More competitive individuals, as measured by their participation in sports, self-select to jobs where they can be rewarded for the productivity of their competitive nature. However, the data used in this study only focused on white males, and females and other races were not included.

Many people may think of someone who likes physical activity as more aggressive, self-confident, and risk-loving, and consider that he or she may be more willing to choose performance-related pay than other individuals. However, to the best of our knowledge, no attention has been paid to this issue in the literature. Therefore, we aim to address this gap by providing new evidence.

The data used in this paper is from a questionnaire survey conducted at Hiroshima City University, Japan. In the survey, a choice experiment is first applied to obtain the individual tradeoff between fixed pay and performance-related pay. In the choice experiment, respondents are asked to choose their preference from the three kinds of payments mentioned above under a hypothetical situation. In the econometric analyses, the Random Parameter Logit (RPL) model is used to estimate individual tradeoffs between fixed and performance-related pay, and then the Ordinary Least Squares (OLS) regression is used to estimate the effects of personal attributes including variables related to physical exercise and sports on the individual tradeoff obtained from the RPL regression.

The rest of this paper is organized as follows. Section 2 introduces the methodological issues. Results are reported in Section 3, and discussions are provided in Section 4. Finally, the last section draws a conclusion.

2. Methodology

2.1 Survey

The survey was conducted between July and November 2015 at Hiroshima City University, Japan. All the respondents are undergraduates at Hiroshima City University. The questionnaire follows Shen et al. (2014) and consists of two parts. The first part consists of choice experiment questions. In the choice experiment, respondents were asked to make repeated choices among three payment schemes in different situations under a hypothetical scenario. At first, a hypothetical scenario about a job description was presented to the respondents. The main points of the scenario are as follows: (1) each respondent is presumed to undertake a 5-hour part-time job of selling snacks at a local festival; (2) the price of each snack would be 150 JP yen; (3) there would be 500 participants in the festival; (4) there would be no other shops selling snacks in the festival; (5) each respondent can choose the payment system they preferred from alternatives we provided.

In each choice set, three alternatives, named payment A, payment B and payment C, were presented to the respondents. A, B, and C represent a pure fixed payment, a pure performance-related payment, and a mixed payment system with both fixed and performance-related pay, respectively. Each payment contains two attributes: hourly pay and pay for each snack sold. The levels of these two attributes in each payment are presented in Table 1. Twenty-seven choice sets were generated by adopting a full factorial design. Then, these choice sets were randomly divided into three different versions, and randomly allocated to the respondents. Each respondent answered one version containing nine choice sets. An example of a choice set is provided in Table 2.

The second part of the questionnaire contains several questions related to respondents' personal information, such as gender, height, risk attitude, questions related to physical activities, and so on. This part of the questionnaire is presented in the Appendix. In total, 211 respondents including 69 males and 141 females answered the questionnaire.[4]

Table 1. Attributes and Their Levels for Each Payment System

Attributes	Levels of attributes		
	Payment A	Payment B	Payment C
Hourly pay (JP yen)	800/900/1000	0	500
Pay for each snack sold (JP yen)	0	80/90/100	30/40/50

Table 2. An Example of a Choice Set

	Payment A	Payment B	Payment C
Hourly pay (JP yen)	900	0	500
Pay for each snack sold (JP yen)	0	100	40
Please choose one most-desirable payment plan by placing a √ in a ☐	☐	☐	☐

2.2 Econometric models

2.2.1 The Random Parameter Logit model

The method used to estimate the choice experiment data is the Random Parameter Logit (RPL) model (or mixed logit model). The RPL model is a very flexible model, which can approximate any random utility model with different distributions of random parameters

[4] One respondent did not report his or her gender.

(McFadden & Train, 2000). Compared to the standard Multinomial Logit model, the RPL model overcomes the taste variation issues and does not exhibit the independence of irrelevant alternatives (IIA) property. Thus, the RPL model can capture individual preference clearly.

Random utility theory (Thurstone, 1927) is the basis of the choice model about decision-making. In the random utility theory about decision-making, the first basic assumption is that decision makers prefer the larger utility, and are more willing to choose the alternative that maximizes their utilities from a set of alternatives. The second is that the utility of an alternative for an individual (U) consists of two parts, a deterministic component (V) and a random error term (ε). Formally, individual q's utility of choosing alternative i can be presented as

$$U_{iq=V_{iq}+\varepsilon_{iq}} \quad (1)$$

Then, the deterministic component of the utility V_{iq} also can be written as:

$$V_{iq} = \beta' X_{iq} \quad (2)$$

where β' is the parameter vector associated with the vector of explanatory variables X_{iq}.

The probability that individual q will choose alternative i over alternative j is given by

$$Prob(i|C) = Prob\{V_{iq} + \varepsilon_{iq} > V_{jq} + \varepsilon_{jq}, \forall\, i \neq j\epsilon C\} \quad (3)$$

where C is the complete choice set. By assuming the error terms in Equation (3) follow the type I extreme value (EV1) distribution and be independently and identically distributed across alternatives and cases, the standard Multinomial Logit model can be expressed as:

$$Prob_{iq} = \frac{\exp(\beta' X_{iq})}{\sum_{c=1}^{C} \exp(\beta' X_{cq})} \quad (4)$$

In the RPL model, the choice probability that an individual q chooses alternative i is expressed as:

$$Prob'_{iq} = \int \frac{\exp(\beta' X_{iq})}{\sum_{c=1}^{C} \exp(\beta' X_{cq})} f(\beta|\theta) d\beta \quad (5)$$

where $f(\beta|\theta)$ is the density function of β with θ referring to a vector of parameters of that density function (mean and variance). Here, the RPL model probabilities $Prob'_{iq}$ are the weighted average of the standard Multinomial Logit probabilities $Prob_{iq}$ and the weights determined by the density function $f(\beta|\theta)$.

By using the RPL model, β can capture observation-specific variations of the effect of X on outcome probabilities with the density function $f(\beta|\theta)$. In RPL models, some elements of the parameter vector β can be assumed to be fixed and others, to be random. However, it is necessary to make a prior assumption about the distribution of random parameters in the RPL model. Normal distribution, log-normal distribution, triangular distribution, and uniform distribution are normally used.

Normal distribution is one of the most popular and commonly used distributions in the RPL model. The assumption of normal distribution means the coefficient is estimated without a strict sign, it could be either positive or negative. However, there is a limitation that normal distribution has an infinite tail, which would present some unreasonable coefficient values in results. Log-normal distribution is a continuous probability distribution of a random variable whose logarithm is normally distributed. A random variable following lognormal distribution only has one side of zero. A triangular distribution is a continuous probability distribution with a lower limit, an upper limit, and a mode. There is a maximal value in the center, dropping off linearly on both sides. A uniform distribution has constant probability density on an interval and zero probability density elsewhere. In this paper, all the above-mentioned distributions are assumed and results based on these assumptions are compared.

As Hensher et al. (2005) showed, the RPL parameter estimates capture information on (1) the distributional form of the marginal utilities of each random parameter (specified by the analyst), (2) the means of the distributions, and (3) the dispersion of the distributions provided as the standard deviation. With this information, it is possible to obtain parameter estimates for each sampled individual. The individual tradeoff between fixed and performance-related pay then can be calculated by dividing the latter parameter by the former.

2.2.2 The Ordinary Least Squares regression

The OLS regression was used to examine the effect of various personal attributes on the individual tradeoff between fixed and performance-related pay obtained from the RPL model. Table 3 provides the definition and descriptive statistics of all variables used in the OLS regression. As shown in the table, there are four variables related to physical exercise and sports – *Like*, *Proficiency*, *Frequency*, and *Minute*. Since significant correlations were observed among these four variables (see Table 4), we ran the OLS regression separately as follows:

Model 1: $y_1 = \alpha_0 + \beta_1 male + \beta_2 like + \beta_3 male\_like + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 2: $y_2 = \alpha_0 + \beta_1 male + \beta_2 proficiency + \beta_3 male\_proficiency + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 3: $y_3 = \alpha_0 + \beta_1 male + \beta_2 frequency + \beta_3 male\_frequency + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 4: $y_4 = \alpha_0 + \beta_1 male + \beta_2 minute + \beta_3 male\_minute + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

In addition, we observed a significant positive correlation between *male* and *height*

(ρ=0.7491, p<0.01), therefore, we did not put *height* directly into Models 1–4 to avoid the multicollinearity. Instead, we replaced *male* with *height* in Models 5–8 and ran the OLS regressions again to check the robustness of our results obtained from Models 1–4.

Model 5: $y_5 = \alpha_0 + \beta_1 height + \beta_2 like + \beta_3 height\_like + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 6: $y_6 = \alpha_0 + \beta_1 height + \beta_2 proficiency + \beta_3 height\_proficiency + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 7: $y_7 = \alpha_0 + \beta_1 height + \beta_2 frequency + \beta_3 height\_frequency + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Model 8: $y_8 = \alpha_0 + \beta_1 height + \beta_2 minute + \beta_3 maleheight\_minute + \beta_4 brothers + \beta_5 health + \beta_6 wellbeing + \beta_7 risk + \varepsilon$

Table 3. Definition and descriptive statistics of variables used in the OLS regression

Variables	Definition	Obs	Mean (S.D)	Min	Max
Male	Dichotomous variable = 1 if male and 0 if female.	210	0.3286 (0.4708)	0	1
Height	Height of the respondent	210	162.2457 (8.3979)	141	189
Brothers	Dichotomous variable = 1 if a respondent has brothers or sisters and 0 otherwise	210	0.9 (0.3007)	0	1
Risk	Use Q5 in Appendix as risk attitude's measure	210	0.6514 (0.1776)	0.2	1
Like	Do you like physical exercise or sports? Likert scales from 0 (don't like it.) to 3 (like it very much)	208	1.8125 (0.9822)	0	3
Proficiency	Are you good at physical exercise or sports? Likert scales from 0 (very week) to 4 (very good at)	208	1.7885 (1.0137)	0	4
Frequency	The frequency of respondents doing physical exercise. Likert scales from 0 (almost not) to 4 (5 times a week or more)	208	1.5577 (1.1278)	0	4
Minute	Time spent on physical exercise once. Likert scales from 1 (less than 30 minutes) to 5 (more than 2 hours)	128	3.1016 (1.2026)	1	5
Health	Likert scales from 0 (bad) to 4 (very good)	205	2.5854 (0.8158)	1	4
Wellbeing	Likert scales from 1 (very unhappy) to 10 (very happy)	206	6.7718 (1.8243)	1	10

Table 4. Correlation coefficients among variables related to physical exercise and sports

	Like	*Proficiency*	*Frequency*	*Minute*
Like	1.000			
Proficiency	0.7397 ***	1.0000		
Frequency	0.4161 ***	0.3192 ***	1.0000	
Minute	0.4084 ***	0.2328 ***	0.0291 *	1.0000

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

3. Results

3.1 Sample description

As shown in Table 3, among all respondents, average height is 162 cm, the tallest is 189 cm, and the shortest is 141 cm. 189 respondents have brothers and sisters accounting for 90% of the total. Q5 in the Appendix is used as the standard measure of risk attitude. In this question, mean is 0.65, max is 1 and min is 0.2. "Overall, how happy would you say you are currently? Using a scale from 1 to 10 where "10" is "very happy" and "1" is "very unhappy," how would you rate you current level of happiness? " is asked as a standard measure of wellbeing, the average score of wellbeing is 6.772. Moreover, variables "like," "proficiency," "frequency," and "minute" represent the questions relating to the individual preference for physical exercise, which is the focus in this paper. Their Likert scale frequencies are listed in Table 5. The average score of "like" is 1.8125, and 141 respondents chose the options of "I like very much" and "I like it," accounting for 67.79% of the total. It means that most of the respondents like physical exercise. The average score of "proficiency" is 1.7885, and only 53 respondents chose the options of "very good at" and "good at," which accounts for 35% of the total. It indicates that most of the respondents are not good at physical exercise. Concerning the frequency measure, it seems that the majority of respondents do physical exercise or sports frequently. The average score of time spent is 3.1016, and 86 respondents taking up 68% of the total do physical exercise or sports for over an hour at a time.

Table 5. Likert scales frequency of variables related to physical exercise and sports

Scales	*Like*	*Proficiency*	*Frequency*	*Minute*
0	28	22	55	
1	39	60	27	11
2	85	73	87	31
3	56	46	33	42
4		7	6	22
5				22
Total	208	208	208	128

3.2 The RPL results

Table 6 presents the estimated results of the Multinomial Logit (MNL) model and Random Parameter Logit (RPL) model. The results presented were estimated by using NLOGIT 5.0, a specialist discrete modeling package in LIMDEP (Econometric Software, Inc.). Compared to the MNL model, the goodness-of-fit measures (i.e., log-likelihood and Pseudo R^2) are significantly improved by applying the RPL model, which suggests the importance of controlling for respondents' heterogeneity.

In the RPL model, parameters of *Hourly pay* and *Pay for each snack sold* are assumed to be randomly distributed, and those of alternative-specific constant terms, *Payment A* and *Payment B*, are assumed to be fixed.

Looking at the random parameters, *Hourly pay* and *Pay for each snack sold* have positive and highly significant influences on the preference for payment schemes in normal, triangular, and uniform distributions. This result indicates that the higher the pay, independent of whether it is fixed or performance-related pay, the happier the respondents are. In log-normal distribution, the mean coefficients of *Hourly pay* and *Pay for each snack sold* are significantly negative, showing that the higher salary makes respondents unsatisfied. Additionally, according to the results of nonrandom parameters, respondents favor the payment B (i.e. the pure performance-related system) and do not prefer the payment A (i.e. the pure fixed system), relative to the system C which mixes both fixed and performance-related pay. The strong significance of the estimated standard deviations of assumed random parameters in all the RPL models shows the existence of heterogeneity in respondents' preferences for payment schemes.

Furthermore, as mentioned in the previous section, it is possible to estimate the marginal tradeoff between fixed and performance-related pay for each respondent by applying the results of the RPL model and conditioning these on the individual choices. The tradeoff here is the marginal rate of substitution between *Pay for each snack sold* and *Hourly pay*. This tradeoff value gives necessary compensation for a one-unit decrease of an attribute to maintain the same level of utility (Hiselius, 2003). For example, in order to maintain the same utility, a decrease in *Pay for each snack sold* by one yen has to be compensated by an increase of the *Hourly pay*. Therefore, the larger the tradeoff is, the respondent prefers the marginal increase in *Pay for each snack sold* rather than *Hourly pay*.

Table 7 presents the results of the individual tradeoff in each distribution. As shown in the table, the minimum and maximum values in a normal distribution are -1744.98 and 71.0295, respectively. This is the same across all the distributions. Recalling the limitation of normal distributions having an infinite tail mentioned in the previous section, which would present some unreasonable coefficient values in results, therefore, we do not use individual tradeoff estimates under the assumption of normal distribution in the OLS regressions. In addition, the mean tradeoffs and their standard deviations are very similar in the other three assumed distributions.

Table 6. Results of the MNL and RPL models

	MNL	Random Parameter Logit model			
		Normal	Triangular	Uniform	Log-normal
		Random parameters in utility functions			
Hourly pay	0.00837***	0.01866***	0.01848***	0.01844***	-3.98881***
Pay for each snack sold	0.05791***	0.09563***	0.09453***	0.10062***	-2.38206***
		Nonrandom parameters in utility functions			
Payment A	-0.51280	-3.24782***	-3.28937***	-3.30459***	-3.33553***
Payment B	0.68911*	1.64076***	1.65902***	1.66264***	1.76007***
		Standard Deviation of random parameters			
Hourly pay		0.00685***	0.01510***	0.01098***	0.37516***
Pay for each		0.04080***	0.12697***	0.09391***	0.43980***
Log likelihood	-1760.22627	-1250.02076	-1244.16866	-1244.36828	-1248.16699
Pseudo R^2	0.0866092	0.4005174	0.4033240	0.4032282	0.4014065

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table 7. The individual tradeoff in each distribution

Distribution	Mean	Std. Dev	Min	Max
Normal	-2.24459	120.7171	-1744.98	71.0295
Triangular	5.616994	4.021813	.948535	22.3638
Uniform	5.542571	3.624941	1.2864	18.3175
Log-normal	5.618518	3.3558	2.12565	20.4424

3.3 The OLS results

Figure 1 shows the mean individual tradeoff for different scales of the four questions related to physical activities. As shown in the figure, it seems that the higher the scale is, the larger the mean individual tradeoff, which suggests a possible positive effect from the preference for physical exercise on the individual tradeoff between fixed and performance-related pay.

Tables 8–10 present the OLS results in triangular, uniform, and log-normal distributions, respectively. Models 1–4 are those using the variable of *Male* and Models 5–8 are those using the variable of *Height* instead of *Male*.

With respect to the results of Models 1–4, as shown in Table 8 for a triangular distribution, *Male* is consistently positive and statistically significant in Models 1 – 4, suggesting that males prefer the marginal increase in the performance-related pay over females. *Like* is positive in Model 1 and statistically significant at the level of 1%, while the interaction term *Male_like* is not significant. This result indicates that respondents who like physical exercise or sports value marginal increases in performance-related pay more highly than in fixed pay. In Model 2, *Proficiency* and the interaction term *Male_proficiency* are positive and statistically significant, suggesting that respondents who are relatively better at physical exercise or sports prefer performance-related pay to fixed pay, and this preference is especially strong in males. In Model 3, *Frequency* is statistically significant and has a positive impact on the individual tradeoff. This means that respondents who do physical exercise or sports more frequently favor the marginal increase in the performance-related pay more. In model 4, *Minute* is statistically insignificant, implying that the time spent on physical activities has no significant impact on the individual tradeoff. Other variables such as *Brothers*, *Health*, *Risk*, and *wellbeing* are not significant in all the models. The estimated results of Models 1–4 under the assumptions of uniform distribution and log-normal distribution are similar to that in the triangular distribution (see Tables 9–10).

Turning to Models 5–8, as shown in Table 8 for a triangular distribution, *Height* is positive and statistically significant in all the four models, suggesting that respondents' height has a positive impact on the individual tradeoff. The taller a respondent is, the more he or she prefers performance-related pay. Similar to those estimates in Models 1–4, *Like*, *Proficiency*, *Frequency*, and the interaction term *Height_proficiency* are positive and statistically significant, and *Minute* and its interaction term with height (*Height_minute*) are not significant. However, the interaction terms *Height_like* and *Height_frequency* are estimated to be positively significant, which is different from those in Models 1– 4. It implies the influence of individual preference and frequency of physical exercise or sports on the tradeoff is dependent on height. Again, other variables such as *Brothers*, *Health*, Risk and wellbeing are not significant in all the models, and the estimated results of Models 5–8 under the assumptions of uniform distribution and log-normal distribution are similar to that in triangular distribution (see Tables 9–10).

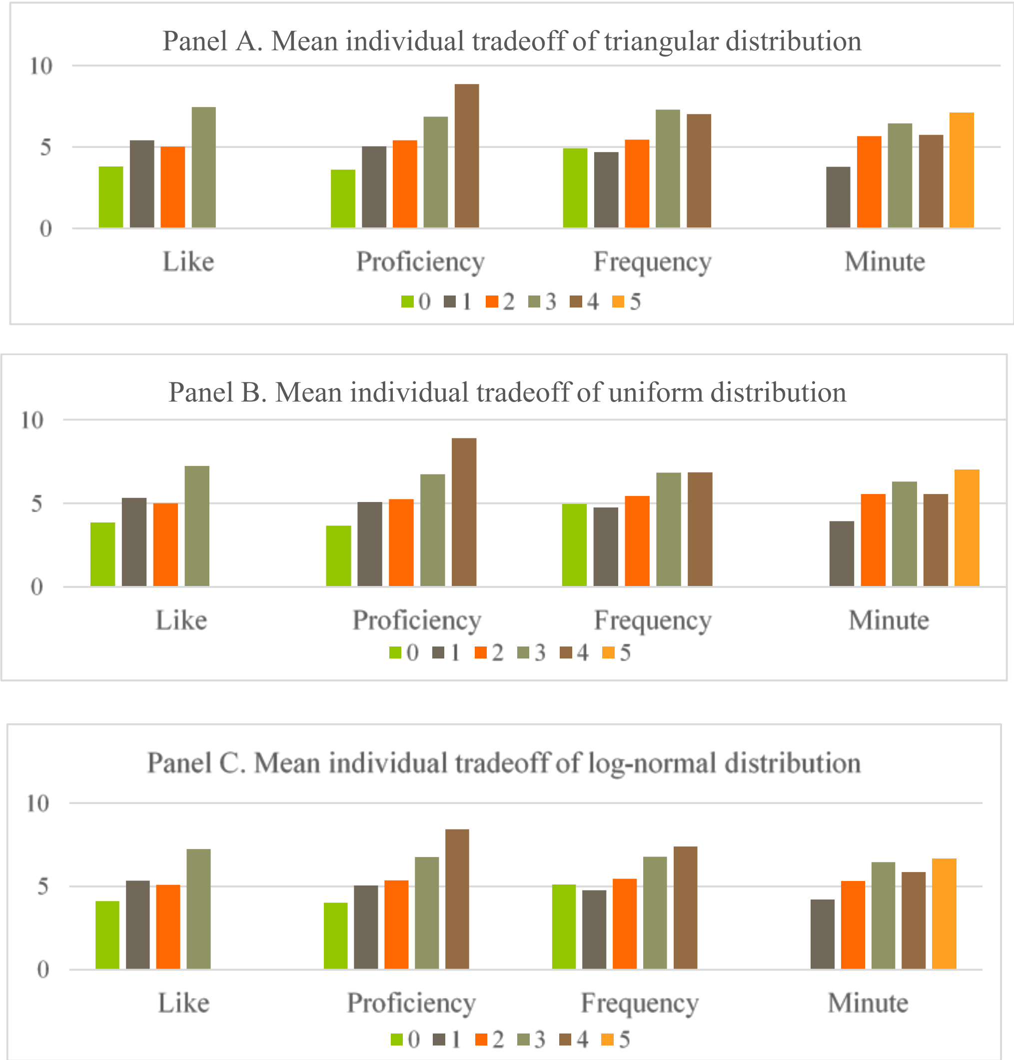

Figure 1. Mean individual tradeoff for different scales of physical exercise or sports

Table 8. Estimated results of OLS model in triangular distribution

	Gender models				Height models			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	5.534***(1.841)	4.802***(1.811)	4.402** (1.901)	6.971**(2.932)	-6.932 (5.774)	-6.084 (5.690)	-10.950**(5.527)	-13.688 (8.789)
Brothers	-0.150 (0.911)	0.167 (0.882)	0.559 (0.905)	-0.016 (1.375)	-0.023 (0.898)	0.240 (0.883)	0.634 (0.893)	0.001 (1.342)
Health	0.010 (0.374)	-0.157 (0.370)	0.198 (0.369)	-0.043 (0.557)	-0.037 (0.371)	-0.104 (0.368)	0.223 (0.364)	0.014 (0.549)
Wellbeing	-0.107 (0.164)	-0.043 (0.159)	-0.097 (0.163)	-0.350 (0.273)	-0.096 (0.162)	-0.069 (0.158)	-0.098 (0.161)	-0.327 (0.269)
Risk	-1.860 (1.551)	-1.449 (1.531)	-0.993 (1.560)	-1.258 (2.316)	-2.006 (1.526)	-1.802 (1.513)	-1.206 (1.535)	-1.569 (2.273)
Male	1.270* (0.604)	1.262** (0.576)	1.459** (0.587)	2.012**(0.873)				
Like	0.863***(0.293)				0.843***(0.293)			
Male_like	0.328 (0.593)							
Height					0.079** (0.034)	0.071** (0.033)	0.098***(0.032)	0.132***(0.0499)
Height_like					0.0568* (0.033)			
Proficiency		0.929***(0.273)				0.849***(0.280)		
Male_proficiency		1.289** (0.568)						
Height_proficiency						0.073** (0.032)		
Frequency			0.532** (0.246)				0.517** (0.242)	
Male_frequency			0.844 (0.525)					
Height_frequency							0.062** (0.030)	
Minute				0.532 (0.348)				0.465 (0.345)
Male_minute				-0.095 (0.693)				
Height_minute								0.011 (0.039)

Note: * p<0.1, ** p<0.05, *** p<0.01; Standard Error in parentheses.

Table 9. Estimated results of OLS model in uniform distribution

	Gender models				Height models			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	5.318***(1.647)	4.640***(1.615)	4.338**(1.706)	6.652** (2.584)	-6.602 (5.150)	-5.744 (5.064)	-10.562**(4.954)	-12.523 (7.724)
Brothers	-0.158 (0.814)	0.132 (0.787)	0.496 (0.812)	-0.129 (1.212)	-0.031 (0.801)	0.222 (0.786)	0.558 (0.800)	-0.091 (1.179)
Health	-0.013 (0.334)	-0.172 (0.330)	0.173 (0.331)	-0.040 (0.491)	-0.060 (0.331)	-0.124 (0.328)	0.195 (0.326)	0.024 (0.483)
Wellbeing	-0.074 (0.147)	-0.015 (0.142)	-0.062 (0.146)	-0.296 (0.241)	-0.065 (0.144)	-0.041 (0.141)	-0.063 (0.144)	-0.281 (0.236)
Risk	-1.663 (1.387)	-1.281 (1.366)	-0.904 (1.400)	-1.075 (2.041)	-1.810 (1.361)	-1.599 (1.347)	-1.119 (1.376)	-1.373 (1.998)
Male	1.201** (0.540)	1.199** (0.514)	1.414***(0.527)	1.898** (0.770)				
Like	0.799***(0.262)				0.781***(0.261)			
Male_like	0.377 (0.530)							
Height					0.076** (0.030)	0.068** (0.030)	0.095*** (0.029)	0.122*** (0.043)
Height_like					0.057*(0.029)			
Proficiency		0.865***(0.244)				0.787***(0.249)		
Male_proficiency		1.245** (0.507)						
Height_proficiency						0.073** (0.028)		
Frequency			0.431* (0.220)				0.418* (0.217)	
Male_frequency			0.793* (0.471)					
Height_frequency							0.057**(0.027)	
Minute				0.475 (0.307)				0.412 (0.303)
Male_minute				0.082 (0.611)				
Height_minute								0.020 (0.035)

Note: * p<0.1, ** p<0.05, *** p<0.01; Standard Error in parentheses.

Table 10. Estimated results of OLS model in log-normal distribution

	Gender models				Height models			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Constant	5.277***(1.463)	4.667***(1.433)	4.411***(1.516)	6.133***(2.311)	-5.096(4.578)	-4.355(4.503)	-8.667*(4.404)	-11.169 (6.908)
Brothers	-0.116 (0.723)	0.148 (0.698)	0.461 (0.721)	-0.100 (1.084)	-0.017(0.712)	0.219(0.699)	0.514 (0.712)	-0.041 (1.055)
Health	0.189 (0.297)	0.050 (0.293)	0.365 (0.294)	0.188 (0.439)	0.149(0.294)	0.097(0.291)	0.384 (0.290)	0.252 (0.432)
Wellbeing	-0.103 (0.130)	-0.051 (0.126)	-0.095 (0.130)	-0.238 (0.215)	-0.098(0.128)	-0.078(0.125)	-0.097 (0.128)	-0.228 (0.211)
Risk	-1.769 (1.232)	-1.395 (1.212)	-1.102 (1.244)	-1.383 (1.825)	-1.929(1.209)	-1.717(1.197)	-1.299 (1.223)	-1.671 (1.787)
Male	1.047** (0.480)	1.059** (0.456)	1.253*** (0.468)	1.674** (0.688)				
Like	0.704***(0.233)				0.695***(0.232)			
Male_like	0.506 (0.471)							
Height					0.066** (0.027)	0.059**(0.027)	0.083***(0.026)	0.110***(0.038)
Height-like					0.054** (0.026)			
Proficiency		0.757***(0.216)				0.688***(0.221)		
Male_proficiency		1.238***(0.449)						
Height_proficiency						0.069***(0.025)		
Frequency			0.381* (0.196)				0.369* (0.193)	
Male_frequency			0.760* (0.419)					
Height_frequency							0.054** (0.024)	
Minute				0.393 (0.274)				0.343 (0.271)
Male_minute				0.160 (0.546)				
Height_minute								0.015 (0.031)

Note: * p<0.1, ** p<0.05, *** p<0.01; Standard Error in parentheses.

4. **Discussion**

This paper focuses on the relationship between the individual preference for physical exercise or sports, and the tradeoff of different payment schemes. The results support the hypothesis that people who prefers physical activities more value the marginal increase in the performance-related pay more highly than in the fixed pay. It can be shown that people who like exercise or sports tends to be more aggressive and competitive in general. Ewing (1998) supports this viewpoint by pointing out that athletic participation may be a signal of an individual who is less likely to shirk. Those people devote more time to athletics than others, and their competitive and hardworking nature makes them more likely to be productive employees. Because of this, the job under the performance-related payment system seems an appropriate one for them. More competitive people, as measured by their preferences for physical exercise or sports, prefer jobs with a performance-related payment system where they can be rewarded for their higher productivity.

The result that amount of time spent on physical exercise at once does not have a significant influence on the preference for payment schemes is somewhat interesting. This evidence is probably reasonable because spending too much time doing physical exercise or sports is harmful to health due to sports fatigue and injury. Therefore, most people would avoid this happening. Therefore, time spent should not be measured as a signal of the preference for physical exercise or sports.

In addition, gender and height have positive and significant influences on the preference for payments. Male or taller individuals prefer the marginal increase in the performance-related pay rather than in the fixed pay. According to evidence from Mauro & Musumeci (2011), males tend to be more risk loving than females and are usually willing to sacrifice assured pay in order to pursue a better reward. As a result, males are more willing to receive a marginal increase in the performance-related pay than females who are usually more risk averse. With respect to height, people may regard taller people as being more persuasive (Young & French, 1996), more attractive (Freedman, 1979; Harrison & Saeed, 1977; Lerner & Moore, 1974), and more likely to work as a leader of other people (Higham & Carment, 1992; Stogdill, 1948). Moreover, height also has a great influence on how people regard themselves. Because taller individuals are always viewed and treated with respect by others, they may develop greater self-worth and self-confidence (Roberts& Herman, 1986). Judge & Cable (2004) analyzed the relationship of physical height to career success, and proved that tall individuals have advantages in their careers. As a result, taller individuals would be more confident about themselves to receive the performance-related pay. Hence, it is plausible that taller individuals prefer the marginal increase in the performance-related pay rather than in the fixed pay.

Yet contrary to the previous literature, the coefficients of risk in this paper are insignificant in all models, showing risk attitude does not have a significant impact on individual tradeoff between fixed and performance-related pay.[5] This may be because among all respondents there are 141 females who tend to be risk averse, and only 69 males. Including too many female respondents in the sample may dilute the effect of risk attitude on individual tradeoffs between different payments.

Finally, this study has several limitations. First, some other socio-demographic variables such as age, education level, and household income are considered to have possible impacts on the preference for payment schemes and should be used in the analysis. However, due to the limitations of the survey that all the respondents are university undergraduates, these variables could not be analyzed. Second, this paper uses self-reported height and the preference for physical activities. Respondents might overestimate their height and might misidentify their preferences, which would jeopardize the validity of the results. Finally, the imbalance between male and female respondents in the sample might be seen as another shortcoming of this study.

5. Conclusion

In this paper, by using the survey data collected at Hiroshima City University, we empirically examined the relationship between individual tradeoff of payment schemes and their preference for physical exercise or sports. The results indicate that respondents who like physical exercise or sports more, who are better at them, and who do them more frequently, are more likely to prefer the performance-related rather than the fixed pay. In addition, males or taller individuals are also found to favor the performance-related pay.

It is a win-win situation for both employers and employees to have an employee preferred payment scheme. Though it is extremely difficult for employers to observe employees' preferences for payment schemes, the results of this study might be able to give employers a new method to elicit employees' preference for payments.

Finally, the limitations mentioned in the previous section suggest a need for more comprehensive studies, with fewer student respondents participating in the survey. Doing so will allow for more socio-economic attributes that might influence individuals' preferences for payment schemes to be investigated.

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[5] The answers of Q6 and Q7 presented in the Appendix were also used as risk attitudes in the OLS models. However, they are not significant.

References

Booth, A. L. & J. Frank (1999) "Earnings, productivity, and performance-related pay," *Journal of Labor Economics*, Vol.17, No.3, pp.447-463.

Cornelissen, T., J. S. Heywood, U. Jirjahn (2011) "Performance pay, risk attitudes and job satisfaction," *Labour Economics*, Vol. 18, pp. 229-239.

Eriksson, T. & M. C. Villeval (2008) "Performance-pay, sorting and social motivation," *Journal of Economic Behavior & Organization*, Vol. 68, pp. 412-421.

Ewing, B. T. (1998) "Athletes and work," *Economics Letters*, Vol. 59, pp. 113-117.

Freedman, D. G. (1979) *Human sociobiology: A holistic approach*, New York: Free Press.

Green, F. (2004) "Why has work effort become more intense?" *Industrial Relations* Vol. 43, pp. 709–41.

Green, C. & J. S. Heywood (2008) "Does performance pay increase job satisfaction?" *Economica*, Vol. 75, pp. 710-728.

Harrison, A. A. & L. Saeed (1977) "Let's make a deal: An analysis of revelations and stipulations in lonely hearts advertisements," *Journal of Personality and Social Psychology*, Vol. 35, pp. 257–264.

Hensher, D. A., J. M. Rose, W. H. Greene (2005) *Applied Choice Analysis: A Prime*, Cambridge University Press. New York.

Higham, P. A. & W. D. Carment (1992) "The rise and fall of politicians: The judged heights of Broadbent, Mulroney and Turner before and after the 1988 Canadian federal election," *Canadian Journal of Behavioral Science*, Vol. 24, pp. 404–409.

Hiselius, L. (2003) "Transportation of dangerous goods by railway: Costs imposed on people living nearby," *Proceedings of the European Transport Conferences 2003 Held 8-10 October 2003, Strasbourg, Trance. Association for European Transport.*

Judge, T. A. & D. M. Cable (2004) "The effect of physical height on workplace success and income: Preliminary test of a theoretical model," *Journal of Applied Psychology*, Vol. 89, pp. 428-441.

Kavetsos, G. (2011) "The impact of physical activity on employment," *The Journal of Socio-Economics*, Vol. 40, pp. 775-779.

Kuhn, K. M. & M. D. Yockey (2003) "Variable pay as a risky choice: Determinants of the relative attractiveness of incentive plans," *Organizational Behavior and Human Decision Processes*, Vol. 90, pp. 323-341.

Lazear, E. P. (1999) "Output-based pay: incentives or sorting?" NBER Working Paper, No. 7419.

Lazear, E. P. (2000) "Performance pay and productivity," *The American Economic Review*, Vol. 90, No. 5, pp. 1346-1361.

Lechner, M. (2009) "Long-run labour market and health effects of individual sports activities," *Journal of Health Economics*, Vol. 28, pp. 839-854.

Lemieux, T., W. B. Macleod, D. Parent (2009) “Performance pay and wage inequality,” *The Quarterly Journal of Economics*, Vol. 124 (1), pp. 1-49.

Leonard, T., K. Shuval, A. D. Oliveira, C. S. Skinner, C. Eckel, J. C. Murdoch (2013) “Health behavior and behavioral economics: Economic preferences and physical activity stages of change in a low-income African American community,” *American Journal of Health Promotion*, Vol. 27, pp. 211-221.

Lerner, R. M. & T. Moore (1974) “Sex and status effects on perception of physical attractiveness,” *Psychological Reports*, Vol. 34, pp. 1047–1050.

Mauro, C. D. & R. Musumeci (2011) “Linking risk aversion and type of employment,” *The Journal of Socio-Economics*, Vol. 40, pp. 490-495.

McFadden, D. & K. Train (2000) “Mixed MNL models for discrete response,” *Journal of Applied Econometrics*, Vol. 15, pp. 447-470.

Origo, F. (2009) “Flexible pay, firm performance and the role of unions. New evidence from Italy,” *Labor Economics*, Vol. 16(1), pp. 64-78.

Pfeifer, C. & T. Cornelissen (2009) “The impact of participation in sports on educational attainment: New evidence from Germany,” *Economics of Education Review*, Vol. 29, No.1, pp. 94-103.

Roberts, J. V. & C. P. Herman (1986) “The psychology of height: An empirical review. In C. P. Herman, M. P. Zanna, & E. T. Higgins (Eds.),” *Physical appearance, stigma, and social behavior: The Ontario Symposium*, Vol.3, pp. 113–140.

Shen, J., K. Ogawa, H. Takahashi (2014) “Examining the tradeoff between fixed pay and performance-related pay: A choice experiment approach,” *Review of Economic Analysis*, Vol. 6, pp. 119-131.

Stamatakis, E., U. Ekelund, N. J. Wareham (2007) “Temporal trends in physical activity in England: the health survey for England 1991 to 2004,” *Preventive Medicine*, Vol.45, pp. 416-423.

Stefanec, N. P. (2010) “Incentive pay: Productivity, sorting, and adjacent rents.” *The Journal of Socio-Economics*, Vol. 39, pp. 171-179.

Stogdill, R. M. (1948) “Personal factors associated with leadership: A survey of the literature,” *Journal of Psychology*, Vol. 25, pp. 35–71.

Thurstone, L. L. (1927) “A law of comparative judgement,” *Psychology Review*, Vol. 34, pp. 273-286.

Yeh, W., Y. Cheng, C. Chen (2009) “Social patterns of pay systems and their associations with psychosocial job characteristics and burnout among paid employees in Taiwan 2009,” *Social Science & Medicine*, Vol. 68, pp. 1407-1415.

Young, T. J. & L. A. French (1996) “Height and perceived competence of U. S. President,” *Perceptual and Motor Skills*, Vol. 82, pp.1002.

Appendix. The second part of the questionnaire

Q2. Your sex?

A. male B. female

Q3. Your height: ____________cm

Your weight: ____________kg

Q4. Do you have brothers or sisters?

A. Yes B. No

Q5. There are two alternatives. Alternative 1 is that you will obtain 100 thousand JP yen with a probability of 100%. Alternative 2 is that you will obtain 200 thousand JP yen with a probability of ( ) %. Please fill in the parenthesis with a numeral so that these two alternatives have the same value to you.

Q6. There are two alternatives. Alternative 1 is that you will obtain 100 thousand JP yen with a probability of 50%. Alternative 2 is that you will obtain 200 thousand JP yen with a probability of ( ) %. Please fill in the parenthesis with a numeral so that these two alternatives have the same value to you.

Q7. When you go out, you will bring the umbrella if a ( ) % chance of rain is announced as the weather forecast. Please fill in the parenthesis with a numeral.

Q8. Do you like physical exercise or sports?

A. I like it very much B. I like it C. Neither like nor dislike D. No, I don't like it

Q9. What's your favorite physical exercise or sports?

First: _______________

Second: _______________

Third: _______________

Q10. Are you good at physical exercise or sports?

A. Very good B. Good C. Ordinary D. Not very good E. Very weak

Q11. How often did you do physical exercise or sports?

A. 5 times a week or more B. 3 to 4 times a week

C. 1 to 2 times a week D. 1 to 3 times a month E. Almost not

If you chose A, B or C in Q11, please continue with Q12.

If you chose D or E in Q11, please go to Q14.

Q12. You said you did physical exercise or sports frequently in Q11, why was that? Multiple selections are allowed.

A. I like it B. To improve your health C. To control your weight

D. To make friends E. I have spare time F. Others

Q13. How many minutes do you usually spend doing physical exercise or sports at a time?

A. Less than 30 minutes B. 30 minutes to 60 minutes C. 60 minutes to 90 minutes

D. 90 minutes to 120 minutes E. More than 2 hours

Please go to Q15

Q14. From the following reasons, what is preventing you from doing physical exercise or sports? Multiple selections are allowed.

A. I don’t like physical exercise or sports B. I do not have the time

C. Physical disability D. The sports facilities are not available

E. I do not have friends to do sports with F. Others

Q15. How about your health currently?

A. Very good B. Good C. Ordinary D. Not very good E. Bad

Q16. Overall, how happy would you say you are currently? Using a scale from 0 - 10 where “10” is “very happy” and “1” is “very unhappy,” how would you rate you current level of happiness?

1 2 3 4 5 6 7 8 9 10