The effects of financial knowledge and attitudes on financial behavior: Evidence from Japanese university students

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金融行動に与える知識、態度の効果：日本の大学生による結果報告

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This study aimed to examine the relationships between the financial knowledge, attitude, and behavior of Japanese university students. Using a questionnaire survey conducted in 2018 (N = 767), we performed multiple regression and logistic regression analyses to identify the factors influencing financial behavior. We could confirm that financial attitude had a statistically positive effect on financial behavior among university students. However, regarding financial knowledge, only the knowledge score for financial economy had a statistically positive effect on the financial behavior score. Representative data of the population and a longitudinal approach are needed to be able to generalize our research.

Keywords：near‐infrared　spectrophotometry（近赤外分光法）calorie answer（カロリーアンサー）
nutritional management（栄養管理）food services（給食）

INTRODUCTION

Background

Under lower economic growth, longer life spans, lower interest and fertility rates, pension and social welfare systems in many developed countries have been facing financial constraints. As a result, in the past few decades, employer-sponsored defined benefit pension plans have been giving way to private defined contribution plans, shifting the responsibility for retirement saving from employers to employees. This is the case in Japan, where the Japanese economic system has been moving from indirect to direct finance, with financial instruments continuing to increase in complexity. This means that individuals need to become more responsible for their personal financial situations and to proactively acquire working financial literacy regardless of age or sex.

Consequently, the importance of financial literacy has become recognized in many countries and research on the relationships among financial knowledge, financial attitudes, and financial behavior has grown in the United States, Europe (Allgood & Walstad, 2016; Fessler, Silgoner, & Weber, 2019; Lusardi & Mitchell, 2014; OECD, 2016; Phan, Rieger, & Wang, 2019), and Southeast Asia countries (Yu, Wu, Chan & Chou, 2015; Zhu, 2018). The Japanese research teams dominated by Yamaoka have conducted extensive assessments of personal finance tests (Yamaoka, Abe, Takahashi et al., 2011; Yamaoka, Abe, Takahashi et al., 2013; Abe, Yamaoka, Takahashi et al., 2013). In general, the teams have used tests created by the Council for Economic Education and by Walstad, Rebeck, and Butters (2013), namely, the Test of Economic Literacy (TEL); and the Test of Financial Literacy (TFL) by Walstad and Rebeck (2017). These tests were developed to measure financial knowledge based on the standards and benchmarks stated in the National Standards for Financial Literacy (Council for Economic Education, 2013). In Japan, there is a need to extend this framework and conduct a new type of survey

designed to assess not only financial knowledge but also financial attitude and financial behavior using a scale similar to that used in other countries.

To that end, our study's objective is to examine the relationships among financial knowledge, financial attitudes, and financial behavior in Japanese university students.

Research framework

Most research on financial behavior has been done following the standard framework illustrated in Figure 1. One characteristic of our research framework, as shown in Figure 1, is to breakdown two of the variables: knowledge and behavior. Our breakdown of knowledge results in three variables: cognitive ability, knowledge of household economy, and knowledge of financial economy. As in the case with knowledge, we breakdown behavior into three variables: a summed scale score of behavior, an income grasp dummy, and an expenditure grasp dummy.

The rest of the paper is organized as follows. In the next section, we discuss our methods including a description of our data and our measures. Subsequently, we present our empirical results and our regression analyses, and discussed.

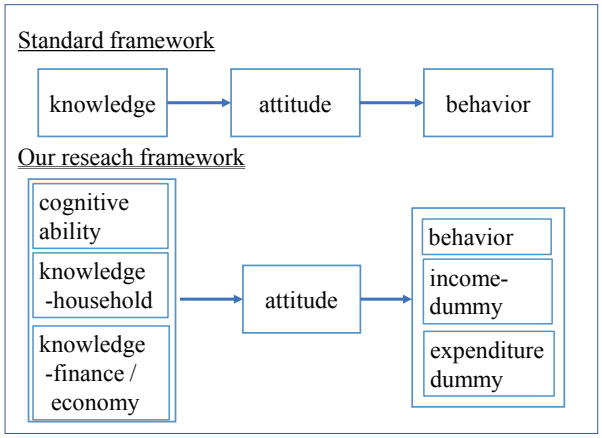

Figure 1. The research framework

METHOD

Data collection

Data were collected through a questionnaire survey of students from seven universities around Tokyo associated with our research group members in September 2018. The number of participants was 780 and the final sample was 767, excluding responses with missing values. Of the sample, approximately 67% were women with freshmen and sophomores representing approximately 70%. The response sheets were in a machine-readable form for ease of analysis.

To measure financial literacy, we adopted some questions from the Financial Literacy Survey 2016 conducted by the Central Council for Financial Service Information (CCFSI) in Japan. This 2016 survey was developed by the CCFSI to assess financial literacy among those aged 18 and over (n=25,000). It was designed around the following eight areas: (1) family budget management; (2) life planning; (3) financial literacy (basic level of financial transaction); (4) financial literacy (basic literacy about finance & economy); (5) financial literacy (insurance); (6) financial literacy (loan & credit card); (7) financial literacy (asset building), and (8) use of information from specialists. These content areas are based on a Financial Literacy Map (CCFSI, 2015), with about half of the questions comparable to the survey results of the FINRA Investor Education Foundation in the United States and those of the OECD/INFE. In our survey, we included the content areas (1) to (4), and (7) from the Financial Literacy Survey 2016, as well as our own original questions to assess Japanese university students' financial literacy.

Measures

We measured financial knowledge using three variables: our type 1 scale of financial knowledge measured cognitive ability; our type 2 scale measured household economic literacy; and our type 3 scale measured literacy of the economy. Our dependent variable was financial behavior while our independent variables were a male dummy, cognitive ability, knowledge score of household economy, knowledge score of financial economy, and attitude score.

Type 1 scale of financial knowledge. The type 1 scale of financial knowledge was used to measure cognitive ability relevant to financial literacy. The scale consisted of four concepts: ratio, percent, interest rate, and inflation rate. To measure this accurately, we employed three stages. In the first stage, we provided a clear definition of arithmetic and economic concepts to the respondents. For example: "The interest rate is the amount a lender charges for the use of assets expressed as a percentage of the principal. The interest rate is typically noted in one year." The respondents were then asked to answer how clearly they understood the concept on a 4-point Likert-type scale ranging from 1 (can understand well) to 4 (cannot understand at all). In the second stage, they were given a basic problem using the same concept; such as, "Let's assume that you will deposit 1 million yen with a bank for one year at an interest rate of 3%. After one year, how much

will you receive as an interest?" The respondents were asked to choose the correct answer from four options. The correct answers were scored as 1 or 0 otherwise. In the third stage, they were given an advanced problem of this same concept. For example; "Let's assume that you will deposit 1 million yen with a bank for one year, and after one year, you will get 500 yen in interest. How much is the interest rate in this case?" Just as the second stage, the respondents were asked to choose the correct answer from the options, with correct answers scored as 1 and 0 otherwise. In total, we designed 12 problems (three stages for each of the four concepts), and summed the scores for the eight problems in the second and third stages for the type 1 scale of financial knowledge (alpha=.688).

Type 2 scale of financial knowledge. The type 2 scale measured the household economy. We used five statements from the CCFSI survey. These covered family budget management, credit cards, contracts, financial trouble, and internet transactions. The CCFSI's questions on the household economy asked respondents to choose the most inaccurate statement among four options. Correct answers were scored as 1 and 0 otherwise. We totaled the scores for the five statements (alpha=.600).

Type 3 scale of financial knowledge. The type 3 scale measured knowledge of the financial economy. As in the type 2 scale, we used six statements from the CCFSI survey. Two of the questions asked participants to select one accurate statement from several options, and four of the questions asked participants to judge whether the statement was true or false on a four-point Likert-type scale; 1= correct, 2= probably correct, 3= probably wrong, and 4=wrong. If correct, the respondents who chose 1 or 2 were scored 1 and 0 otherwise, and vice versa for incorrect answers. The alpha coefficient indicated that the internal consistency of these six items was very low at .388. This suggested a lack of concrete evidence regarding the respondents' financial knowledge, thereby remaining ambiguous.

Financial attitude towards money. To measure financial attitude towards money, we used statements from the CCFSI survey as well. As Eagly and Chaiken (1993) point out, the concepts of attitude and behavior often overlap. They explain that attitude reflects "a tendency to act in a favorable or unfavorable way towards an objective." According to this definition, we identified the following four statements to measure financial attitude towards money: "I find it more satisfying to spend money than to save it for the long term" (r). "I tend to live for today and let tomorrow take care of itself" (r). "I have too much debt right now" (r). "When making a deposit or an investment, even if it may lose money, I think that it is unavoidable" (r). The responses were measured using a self-reported, four-point Likert-type scale where a higher sum indicated a higher level of a long-term, stable, and non-speculative attitude (α =.583).

Financial Behavior. Financial behavior was measured through two types of questions. The first questions consisted of the following five statements assessed on a four-point Likert-type scale: "Before I buy something, I carefully consider whether I can afford it." "I pay my bills on time." "I set long term financial goals and strive to achieve them." "I keep a close watch on my financial affairs." , and "When there are several similar products, I tend to buy what is recommended as the most popular product rather than what I actually think is a good product" (r). A higher sum meant the individual reflected a higher level of being careful, stable, and behaving in a financially literate way (α =.529). The second questions were true/false and converted to a dummy variable.

Table 1 Correlations of the variables

		M	SD	1	2	3	4	5	6	7
1	behavior score	15.74	2.41	1						
2	income dummy	.81	.40	.259**	1					
3	expenditure dummy	.45	.50	.310**	.316**	1				
4	cognitive ability	5.27	1.65	.051	.089*	.065	1			
5	knowledge score of household economy	4.26	1.09	.134**	.249**	.090*	.323**	1		
6	knowledge score of financial economy	4.52	1.23	.120**	.123**	.102**	.386**	.365**	1	
7	attitude score	11.40	2.51	.408**	.128**	.133**	.073	.201**	.104**	1
	* p<.05, ** p<.01 (two tailed).									

Table 2 The results of ANOVA

	gender			grade		
behavior score	F(1,740)=8.311	**	male>female			
income dummy		n.s.				
expenditure dummy		n.s.				
cognitive ability		n.s.		F(3,749)=2.526	+	Junior>sophpomore, senior, freshman
knowledge score of household economy	F(1,761)=5.340	*	female>male	F(3,759)=4.329	**	Junior>sophpomore, senior, freshman
knowledge score of financial economy		n.s.		F(3,731)=3.857	**	Junior>sophpomore, freshman, senior
attitude score		n.s.				
Note1: ***p<.001,**p<.01,*p<.05, +p<.1						
Note2: n.s.= not significant.						

These questions were: "I know the amount of my monthly income" and "I know the amount of my monthly expenditure" (r=.316).

RESULTS

Descriptive statistics and the correlations of the variables are as shown in Table 1. We found a statistically significant correlation between the three financial behavior measures and the three financial knowledge measures. We also found a statistically significant correlation between financial behavior and financial attitude. However, financial knowledge did not correlate significantly with financial behavior.

We conducted preliminary analyses to examine differences in student mean scores through analysis of variance, ANOVA, and a post-hoc Tukey test (see Table 2). For the behavior scores, male scores were statistically significantly higher than those of females. However, female scores for knowledge of household economy were statistically significantly higher than those of the males. In terms of grade, juniors had the highest scores on knowledge compared with the other grades.

We also conducted a multiple regression analysis of knowledge and the attitude variables for financial behavior (see Table 3). We found that the male dummy, knowledge score of financial economy, and the attitude score had statistically positive effects on the financial behavior score.

We used multivariable logistic regression as well. Table 4 reports the ratios and 95% confidence intervals from the logistic regression analysis on the income dummy. Compared with individuals who do not know the amount of their monthly income, we found that the knowledge score for household economy (CI: 1.256-1.826) and the attitude score (CI: 1.012-1.184) had statistically positive effects on the income dummy.

We also conducted a logistic regression analysis on the expenditure dummy as well, but the Hosmer-Lemeshow test suggested that the model did not fit the observed data well.

DISCUSSION

The purpose of this study was to examine the relationships among financial knowledge, financial attitudes, and financial behavior among Japanese university students. This is the first survey of its kind to study this in Japan. Using a questionnaire survey conducted in 2018 (N = 767), we performed multiple regression and logistic regression analyses to determine the factors influencing financial behavior. We were able to

Table 3 Result of a multiple regression analysis on financial behavior score

	β		
(constant)			
male dummy	.119	***	
cognitive ability	-.031		
knowledge score of household economy	.046		
knowledge score of financial economy	.082	*	
attitude score	.394	***	
Ajusted-R2	.181		
F value	31.420		

Table. 4 Result of logistic regression analysis on income dummy

	B	SE	Wald	d.f	Exp(B)	significance probability		EXP(B) 95%CI		
(constant)	-1.655	.598	7.654	1	.191	.006	**			
male dummy	.321	.222	2.091	1	1.379	.148		.892	-	2.132
cognitive ability	-.001	.067	.000	1	.999	.982		.875	-	1.139
knowledge score of household economy	.415	.096	18.853	1	1.514	.000	***	1.256	-	1.826
knowledge score of financial economy	.074	.092	.649	1	1.077	.420		.900	-	1.288
attitude score	.090	.040	5.078	1	1.095	.024	*	1.012	-	1.184
-2 log likelihood	622.398[a]									
Cox-Snell R2	.055									
Nagelkerke R2	.090									
Hosmer-Lemeshow test	.838									
Note: CI=confidence interval										

confirm that financial attitude had a positive effect on financial behavior among university students. In so doing, our study adds a Japanese perspective to the growing body of research in the area of financial literacy.

As Table 5 shows, financial attitude had a statistically positive effect on both the financial behavior score and the income dummy, which is in line with previous study results. However, as for financial knowledge, only the knowledge score for the financial economy had a statistically positive effect on the financial behavior score.

Moreover, only the knowledge score of household economy had a statistically positive effect on the income dummy. Additionally, cognitive ability had no effect on either dependent variable contrary to expectations. Therefore, future studies are needed to identify the mechanisms underlying the association between financial knowledge and financial behavior.

As for the association between financial attitude and financial behavior, in the future, we could expand the research framework that uses the theory of reasoned action. The theory of reasoned action was proposed in 1975 by Fishbein and Ajzen and is one of the most influential behavioral change theories. One characteristic of this theory is to allocate a "behavior intention" as a mediating variable between "attitude" and "behavior." Thus, a future step in our research could be to measure not only the score of knowledge, attitude, and behavior but also the score of behavioral intention.

This research also has some limitations. First, all the results were based on respondent self-reporting; namely, we did not assess actual behavior. Second, our data were cross-sectional and thus not representative of the population. In the future, we will use a longitudinal approach and population representative data to be able to generalize our research.

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NAKANO Yumiko is one of our research group members.

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和文抄録

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