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An Empirical Investigation of Japanese Investors

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Abstract

This study examines the relationship between the Big Five personality traits—extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness—and investment behavior using a questionnaire survey. In the survey, the respondents were asked questions about their investment behavior in a hypothetical scenario where they have extra money to invest. Respondents were also asked about their reasons for buying the stocks they currently held as well as their individual investment preferences. The results showed that the respondents' investment preferences differed according to their Big Five personality traits. Respondents with high openness were more positive about investing, whereas those with high neuroticism preferred relatively low-risk bonds and invested with a short-term perspective. Our findings can be applied to design investment promotion measures such as personalized nudges.

Keywords: Personality, Investor heterogeneity, Behavioral finance

JEL classification: D91, G11, G41

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1. Introduction

What determines an individual's investment behavior? Empirical research proposes that investment behavior is determined by factors such as wealth, education, cognitive abilities, social interaction, trust, and personality characteristics. Personality is also an essential factor that determines investment behavior. In financial literature, the most frequently cited personality trait is risk aversion, which has been well studied both theoretically and empirically in the context of financial behavior. However, risk aversion is not the only dimension of personality. In psychology, there are a myriad ways to view personality; yet, most are not well documented in economic analyses.

In this study, we focus on the Big Five personality traits, which are among the most well-known measures of general personality. The Big Five model considers five dimensions of personality: extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness. Individuals with high extraversion enjoy challenges, and they are often described as gregarious, assertive, and sociable. High neuroticism is associated with sensitivity, and individuals are more prone to feeling insecure, anxious, or depressed. High openness to experience is associated with individuals who are creative, curious, and cultured. High conscientiousness represents the extent of self-management and planning and is evident in individuals who are well organized. High agreeableness is related to harmony, trustworthiness, altruism, and cooperative behavior.

Some studies have examined the relationship between Big Five traits and individuals' financial behavior. Specifically, Mayfield et al. (2008) separated investment intentions into short- and long-term intentions. They measured short-term intentions using questions such as "I intend to invest in an IRA every year," "I intend to engage in portfolio management activities at least twice per week," and "I intend to perform my own investment research instead of using outside advice." Their definition of short-term investment intentions can be interpreted as the extent to which individuals think about investments in their daily life. In result, they showed that the persons with high extraversion have strong long-term intentions, while those with high neuroticism have weak. This means that the individuals with high extraversion are more likely to incorporate investment decisions into their daily lives, whereas the individuals with high neuroticism want to distance themselves from investment-related decision-making. The study also measured long-term investment intentions using questions such as "I intend to take an investments course" and "I intend to invest some money in long-term assets where my money will be tied up and inaccessible for years." Their results showed people with high openness to experience have strong long-term investment intentions and are interested in investing. They believe that it is worth spending time to understand and practice investing. Moreover, Mayfield et al. (2008) measured risk tolerance, and their results indicated that the people who are risk averse have low short- and long-term investment intentions. The Big Five traits measured different dimensions of personality based on risk tolerance.

Durand et al. (2013) conducted laboratory experiments to reveal the relationship between

Big Five personality traits and investment behaviors among university students. The participants were given a hypothetical \$50,000 to invest over a period of two months. As the experiment was part of a university course, the participants' final profit or loss affected their grade. They also included additional incentives such as a penalty for not investing a certain amount. During the experiment, it was possible to observe each participant's portfolio status, the number of trades they made, the number of stocks they held, and their total return. The findings demonstrated that people with high neuroticism did not like stocks in small companies and preferred stocks with high risk. People with high openness had a diverse portfolio. When short-term momentum one month before the start of the experiment and long-term momentum one year before the start of the experiment were calculated, people with low conscientiousness tended to choose stocks with high short-term momentum, whereas those with low agreeableness tended to choose stocks with high long-term momentum. In addition, participants with high neuroticism made fewer trades and, consequently, their returns were higher. Participants with high levels of conscientiousness made more trades, possibly because they were trading in a university class environment. People with high levels of neuroticism and extraversion made diversified investments. Furthermore, participants with higher neuroticism were more likely to use availability heuristics. The study also found that participants with low neuroticism and low extraversion tended to be impatient to make a profit and were unable to cut their losses, whereas people with high conscientiousness tended to do the opposite.

Nandan and Saurabh (2016) tested a model in which they examined how Big Five personality traits affect investors' appetite for risk, which in turn affects investment motivation, using a mediating analysis. Their results indicated that neuroticism, extraversion, and openness affect short-term investment motivation via risk appetite in relation to investment.

In our previous paper (Yamane et al. 2022), we conducted a questionnaire survey on the relationship between Big Five personality traits and investment behavior in Japan. Our questionnaire included detailed questions about investment behavior, such as the reasons for purchasing stocks and mutual funds currently held, whether the respondent intended to hold them for the long term, and the characteristics of companies that the respondent would be willing to invest in if they had extra money. The results explained that people with high neuroticism tended to hold stocks and mutual funds for shorter periods and did not hold active funds. In addition, we found a relationship between the Big Five personality traits and investment preferences. People with high openness tend to prefer emerging market stocks and those with high agreeableness tend to prefer companies that are proactive in their approach to the United Nations' sustainable development goals (SDGs).

In this study, we first focus on the hypothetical question of whether investors would buy stocks or mutual funds if they had extra money. When purchasing financial assets in real life, usually, there are financial constraints; hence, it is not always possible to realize an individual's true preferences. In this study, we use hypothetical questions to measure true preferences for the financial

assets and characteristics of the companies that they want to buy. We present the reasons for purchasing the stocks and mutual funds that people currently own, based on Big Five personality traits. This makes it possible to clarify the relationship between actual investment behavior and the Big Five traits, rather than just preferences.

This research is unique because it examines in detail people's investment interests and the reasons for their investment behavior. This study will be useful for interventions, such as nudges, to promote investment. Many countries, including Japan, are struggling with low investment rates. Governments are taking various measures to promote investment among citizens, but few approaches consider individual personality traits and preferences. Therefore, this research will attempt to clarify the relationship between personality traits and investment preferences, and why people start to invest. Based on the findings, the study proposes investment promotion measures that are more tailored to individuals' personality traits.

The rest of this paper is organized as follows: Section 2 explains the details of the questionnaire survey, Section 3 presents the estimation models, Section 4 reports the results of the regression analysis, and Section 5 discusses the results.

2. Methods

We conducted an online survey of individuals between 30 and 79 years old who had invested within the last five years. This survey was conducted from November 17–25, 2020. Our survey consisted of three parts: the measurement of Big Five traits, the measurement of investment style and interests, and demographic characteristics. The details of the questionnaire are summarized in Appendix 1. In total, 400 respondents (300 men and 100 women) participated in the survey; their average age was 56.87 (SD=10.95).

To measure the respondents' Big Five personality traits, we used the Japanese simplified Big Five scale developed by Namikawa et al. (2012). The scale included the following question: "How much do each of the following words apply to you in your daily life?" Respondents replied using a seven-point scale from "Very applicable" to "Not applicable at all." Respondents also rated the applicability of 29 words that represent Big Five personality traits such as "talkative," "curiosity," and "careless."

For our first key variable, we asked two hypothetical questions to extract individuals' investment preferences. The first question was: "Suppose that you can afford to purchase a few financial instruments. Which financial instruments would you choose?" The respondents were presented with a list of stocks, bonds, mutual funds (passive), mutual funds (active), futures and derivatives, foreign currency, commodities, and cryptocurrency. In addition, we asked the following question about the respondents' choice of company: "Suppose you can afford to purchase some stocks and mutual funds. Please indicate all the features of the company that you would be willing to invest

in.” The options were listed companies, privately held companies, companies with high dividend yields, companies active in SDGs, large companies with a long history, venture companies, small and medium-sized companies, industries with growth potential, real estate investment trusts (REITs), and high-yield debts. We also asked whether the companies had to be domestic, in developed countries, or in developing countries.

Our second key variable was the reasons for purchasing the shares they currently owned. We asked, “Please select all the reasons that apply to why you bought the following stocks.” The respondents could select multiple answers from a list of 15 reasons that applied to them. The 15 reasons were as follows: “I thought the price would rise significantly in the future,” “The dividend yield was high,” “The shareholder benefits were attractive,” “I thought the risk of bankruptcy or a large price drop was low,” “The company is one that manages its business with consideration for environmental, social, and governance (ESG),” “It is a stock of a new industry or new company,” “It is a stock of a historic industry or traditional company,” “It is a stock of a local company,” “It is a stock of a company I want to support,” “I had the opportunity to obtain it as a private placement stock,” “I had the opportunity to purchase it through a stock option scheme or employee stock ownership plan,” “It was a stock recommended by a family member or acquaintance,” “It was a stock recommended by a salesperson or investment advisor,” “It was a product offered for purchase through a defined contribution pension plan,” and “Other.”

Four questions captured the respondents’ current investment style: current portfolio, the type of financial assets they bought during the last five years, how often they reviewed their portfolio, and what percentage of household income they allocated to the purchase of risky financial products each month.

Regarding the respondents’ current financial assets, we asked what market it was listed in, the reasons for buying each stock, the year that they first bought it, whether they bought it with the intention of trading, and whether they bought it with the intention of holding it for five years or more. Regarding mutual funds, we asked about the components of each mutual fund (e.g., domestic equities, domestic bonds, developed country equities, etc.), whether that mutual fund was an active fund, the reasons for investing in each mutual fund, the year in which they first invested in it, whether they bought shares with the intention of trading the trend, and whether they bought it with the intention of holding it for five years or more. An individual’s asset records may include items not voluntarily acquired, such as those obtained through inheritance or nominal ownership. To address this, we explained to the respondents to “answer only about the stock and mutual fund that you made the decision to purchase.”

3. Model

Our regression model can be represented as follows:

$$Y_i = \beta_0 + \beta_1 BigFive_i + \beta_2 X_i + \varepsilon_i \quad (1)$$

Y_i shows the dependent variables. We have three categories of explanatory variables. The first two are responses to hypothetical questions: the type of financial assets (8 in total) respondents want to buy and the characteristics (12 in total) of the companies they want to invest in. The remaining category is the reason for buying the stocks that they currently own. All dependent variables are binary and take the value of 1 if the respondents answered “Yes, I want to invest in this asset,” “Yes, I want to invest in this company,” or “Yes, I bought the stocks for that reason,” and otherwise 0. We conducted a logit estimation on each dependent variable.

$Bigfive_i$ represents the main independent variables, namely, the Big Five traits: extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness. Our main interest is whether β_1 is significant. We used socio-demographic characteristics as control variables X_i , which included sex, age, educational year, income, the number of households, and occupation. For the occupation variables, we used two dummy variables: non-regular employee and unemployed. All options for the control variables are presented in Appendix 2.

4. Results

4.1 Hypothetical questions

4.1.1 Descriptive statistics

Table 1 summarizes the descriptive statistics of the Big Five personality traits in our data. We measured the traits on a seven-point scale. Table 2 presents our dependent variables, the type of financial assets, and the characteristics of companies that the respondents want to invest in.

Regarding financial assets, approximately 60% of the respondents indicated they would invest in stocks if they could afford to, 47% respondents chose passive mutual funds, and 10% chose the remaining options (active mutual fund, bond, futures, foreign currency, commodities, and cryptocurrency). Only 4% of the respondents said they would invest in futures. As for the characteristics of the companies they would invest in, approximately 90% said they would invest in domestic companies, while 38% and 17% of the respondents chose developed and developing companies, respectively. In addition, 85% of the respondents chose listed companies. A few of the respondents said they would invest in privately held companies, REITs, and high-yield bonds.

The descriptive statistics of the socio-demographic variables, such as education year, own income, household income, the number of households, occupation, and purchase of risky financial instruments as a percentage of monthly income, are summarized in Appendix 2.

Table 1. Descriptive statistics of the Big Five personality traits

Variable	Mean	SD	Min	Max
Extraversion	4.01	1.09	1	7

Neuroticism	4.12	1.12	1	7
Openness	4.11	0.93	1	7
Conscientiousness	4.36	0.95	1	7
Agreeableness	4.31	0.80	1	6.67

Table 2. The assets and companies respondents said they would invest in

Category	Variable	Mean	SD
Type of financial assets they would purchase	Stocks	0.625	0.485
	Bonds	0.115	0.319
	Mutual funds (passive)	0.325	0.469
	Mutual funds (active)	0.153	0.360
	Futures	0.040	0.196
	Foreign currency	0.165	0.372
	Commodities	0.135	0.342
	Cryptocurrency	0.135	0.342
The characteristics of the companies would invest in	Domestic	0.893	0.310
	Developed countries	0.383	0.487
	Developing countries	0.173	0.378
	Listed companies	0.855	0.353
	Privately held companies	0.075	0.264
	Companies with high dividend yields	0.343	0.475
	Companies active in SDGs	0.125	0.331
	Large companies with a long history	0.125	0.331
	Venture companies	0.130	0.337
	Industries with growth potential	0.155	0.362
	REITs	0.098	0.297
	High-yield bonds	0.018	0.131

Note: REITs, real estate investment trusts; SD, standard deviation; SDGs, sustainable development goals.

4.1.2 Regression

4.1.2.1 The assets the respondents said they wanted to invest in

Table 3 summarizes the estimation results of the effect of Big Five personality traits on the type of financial assets the respondents want to purchase. There are eight dependent variables. Overall, openness to experience is significantly associated with the asset choice, specifically, stocks, active mutual funds, futures, and foreign currency. This finding is reasonable as individuals with a high openness to experience enjoy unconventional and new things. Regarding the other traits, individuals with high neuroticism want to invest in bonds, and those with high conscientiousness tend to avoid investing in active mutual funds. Considering the nature of neuroticism, it is also convincing that the respondents who have high neuroticism prefer to invest in bonds, which are relatively low risk investments, as they are more cautious and sensitive to risk. Investors with high conscientiousness are generally very organized, so it would be natural for them to avoid active mutual funds that fluctuate in price. We also observed that those with high agreeableness prefer futures significantly and those with high extraversion do not want to invest in foreign currency. We used own income as a control variable in this regression; however, the estimation results were almost identical when we used household income or income per capita.

Table 3. Type of financial assets the respondents wanted to purchase

	(1) Stocks		(2) Bonds		(3) Mutual funds (passive)		(4) Mutual funds (active)	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
Extraversion	-0.086	0.135	0.150	0.206	-0.128	0.141	-0.228	0.179
Neuroticism	0.055	0.123	0.372	0.196 *	0.065	0.130	-0.094	0.167
Openness to experience	0.275	0.155 *	-0.105	0.238	0.156	0.163	0.414	0.209 **
Conscientiousness	-0.065	0.131	0.157	0.193	-0.141	0.138	-0.313	0.184 *
Agreeableness	0.068	0.156	0.254	0.234	0.191	0.164	0.327	0.216
Male	0.359	0.293	0.064	0.463	0.274	0.322	0.314	0.441
Age	0.011	0.012	0.012	0.019	-0.035	0.013 ***	0.006	0.017
Educational year	-0.072	0.060	0.014	0.090	0.238	0.067 ***	0.236	0.092 ***
Own income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Number of households	-0.119	0.094	-0.100	0.147	0.043	0.097	0.115	0.129
Non-regular employee	0.073	0.357	-0.583	0.559	0.223	0.368	0.817	0.448 *
Unemployed	-0.106	0.312	-0.725	0.497	0.099	0.330	0.276	0.430
Constant	-0.142	1.619	-5.941	2.598 **	-3.369	1.750 *	-6.811	2.385 ***

Table 3 (cont.)

	(5) Futures		(6) Foreign currency		(7) Commodities		(8) Cryptocurrency	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
Extraversion	-0.156	0.297	-0.292	0.170 *	0.170	0.192	0.170	0.192
Neuroticism	0.425	0.327	-0.142	0.155	0.082	0.172	0.082	0.172
Openness to experience	0.583	0.348 *	0.341	0.192 *	0.137	0.215	0.137	0.215
Conscientiousness	-0.520	0.344	-0.151	0.170	0.058	0.183	0.058	0.183
Agreeableness	0.838	0.416 **	-0.137	0.195	-0.212	0.229	-0.212	0.229
Male	0.669	0.810	-0.192	0.380	-0.688	0.385 *	-0.688	0.385 *
Age	-0.042	0.032	0.012	0.016	-0.019	0.017	-0.019	0.017
Educational year	0.242	0.169	0.069	0.077	0.005	0.086	0.005	0.086
Own income	0.000	0.001	-0.001	0.001 *	0.000	0.000	0.000	0.000
Number of households	0.426	0.200 **	0.137	0.118	-0.077	0.126	-0.077	0.126
Non-regular employee	0.981	0.857	0.477	0.410	-0.748	0.601	-0.748	0.601
Unemployed	0.972	0.838	-0.493	0.414	0.065	0.423	0.065	0.423
Constant	-12.103	4.835 **	-1.481	2.086	-1.171	2.282	-1.171	2.282

Table 4. The number of respondents who wanted to invest in each asset based on whether they already owned/did not have assets

	Status	Mean	SD	Obs.
Stocks	Do not have	0.339	0.475	177
	Have	0.852	0.356	223
Bonds	Do not have	0.072	0.259	362
	Have	0.526	0.506	38
Mutual funds (index)	Do not have	0.190	0.393	253
	Have	0.558	0.498	147
Mutual funds (active)	Do not have	0.051	0.221	253
	Have	0.327	0.471	147
Futures	Do not have	0.018	0.133	388
	Have	0.750	0.452	12
Commodities	Do not have	0.103	0.305	377
	Have	0.652	0.487	23
Cryptocurrency	Do not have	0.128	0.335	366
	Have	0.206	0.410	34

Table 5. The type of financial assets the respondents wanted to purchase with the cross-term

	Stocks		Bonds		Mutual funds (passive)		Mutual funds (active)	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
Extraversion	-0.219	0.208	0.173	0.259	-0.153	0.228	-0.325	0.417
Neuroticism	-0.054	0.164	0.381	0.235	-0.075	0.167	-0.305	0.262
Openness to experience	0.281	0.240	-0.364	0.309	-0.036	0.262	0.562	0.441
Conscientiousness	0.022	0.200	0.140	0.239	-0.379	0.214 *	-0.382	0.393
Agreeableness	-0.193	0.228	0.275	0.268	0.360	0.230	-0.082	0.424
Hold * Extraversion	0.460	0.317	0.178	0.629	0.218	0.309	0.283	0.466
Hold * Neuroticism	0.216	0.186	-0.093	0.302	0.214	0.177	0.256	0.261
Hold * Openness to experience	-0.163	0.381	0.374	0.650	0.204	0.379	-0.353	0.519
Hold *Conscientiousness	-0.390	0.296	0.236	0.504	0.519	0.287 *	0.087	0.443
Hold * Agreeableness	0.582	0.339 *	-0.047	0.751	-0.651	0.327 **	0.361	0.488
Male	-0.017	0.351	0.165	0.504	0.288	0.358	0.185	0.478
Age	-0.018	0.015	0.003	0.021	-0.054	0.015 ***	-0.003	0.019
Educational year	-0.191	0.074 ***	-0.062	0.101	0.222	0.074 ***	0.205	0.102 **
Own income	0.000	0.000	-0.001	0.001	-0.001	0.000	-0.001	0.000
Number of households	-0.198	0.114 *	-0.193	0.162	-0.023	0.107	0.044	0.133
Non-regular employee	0.238	0.419	-0.681	0.601	0.298	0.406	1.147	0.516 **
Unemployed	-0.115	0.377	-0.745	0.556	0.087	0.361	0.205	0.481
Constant	4.243	2.030 **	-3.567	2.927	-0.806	1.976	-4.264	2.577 *

We then distinguished between respondents who already have each asset (stocks, bonds, mutual funds, futures, commodities, and cryptocurrency) and those who do not. Table 4 represents the descriptive statistics of the number of respondents who want to invest in each asset class based on whether they currently have or do not have these assets. The results show that people who have specific assets are more willing to invest than those who do not. For example, 85% of the respondents who own stocks want to invest more, compared to only 34% of the respondents who do not own stocks. Approximately 53% of the respondents who have bonds want to invest more, compared to only 7% of the respondents who do not have bonds.

Subsequently, we noticed that the regressions with the cross term between Big Five personality traits and the dummy variables is 1 if the individual currently owns assets. As presented in Table 4, a small number of respondents have futures, foreign currency, commodities, and cryptocurrency; therefore, we only checked stocks, bonds, passive mutual funds, and active mutual funds. Table 5 presents the results of this estimation. For stocks, the respondents with high agreeableness and who already have stocks tend to want more stocks significantly. For passive mutual funds, the respondents with high agreeableness and who have mutual funds tend to avoid investing in passive mutual funds. In addition, respondents with high conscientiousness and who do not have mutual funds tend to avoid investing in these funds, but those who already have mutual funds want more such funds. We found no significant difference in the Big Five traits and interest to invest in bonds and active mutual funds, regardless of the respondents' pre-existing ownership of these assets.

4.1.2.2 The characteristics of the companies that people want to invest in

Table 6 shows the estimation results for the characteristics of companies that the respondents want to invest in. In this estimation, we have 12 dependent variables. Respondents with high openness to experience want to invest in listed companies, non-listed companies, and venture companies. Interestingly, respondents with high neuroticism prefer to invest in high-yielding dividend stocks. Respondents with low extraversion want to invest in listed companies, because low extraversion indicates that they have a preference for stability/low-stimulation. We also found agreeableness affects investment in listed companies, high dividend companies, and the companies working on SDGs, because people with high agreeableness value cooperativeness and altruistic behavior in companies working on SDGs.

Table 6. The characteristics of companies that respondents want to invest in

	Domestic		Developed countries		Developing countries		Listed companies		
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	
Extraversion	-0.025	0.211	0.061	0.137	0.190	0.170	-0.390	0.191	**
Neuroticism	-0.184	0.199	0.183	0.127	0.238	0.164	0.014	0.165	
Openness to experience	0.222	0.251	0.158	0.158	0.293	0.198	0.411	0.214	*
Conscientiousness	-0.165	0.204	0.024	0.134	-0.057	0.166	-0.142	0.181	
Agreeableness	0.083	0.237	0.224	0.161	0.211	0.208	0.500	0.220	**
Male	-0.573	0.499	0.584	0.315	* -0.117	0.380	-0.063	0.406	
Age	0.054	0.019	*** -0.022	0.012	* -0.002	0.016	0.013	0.016	
Educational year	-0.118	0.096	0.208	0.064	*** 0.037	0.080	-0.028	0.083	
Own income	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Number of households	0.125	0.151	-0.052	0.096	0.196	0.114	* 0.064	0.133	
Non-regular employee	0.323	0.588	-0.160	0.366	0.642	0.422	0.566	0.561	
Unemployed	0.190	0.524	0.079	0.317	-0.105	0.417	-0.039	0.419	
Constant	1.343	2.592	-5.484	1.714	*** -6.286	2.233	*** -0.430	2.174	

Table 6 (cont.):

	Privately held companies		Companies with high dividend yields			Companies active in SDGs		Large companies with a long history	
	Coef.	Std.	Coef.	Std.		Coef.	Std.	Coef.	Std.
Extraversion	-0.174	0.242	0.055	0.138		0.043	0.194	0.094	0.199
Neuroticism	0.068	0.220	0.363	0.133	***	0.077	0.181	0.060	0.179
Openness to experience	0.543	0.277	**	-0.065	0.161	0.323	0.227	0.114	0.227
Conscientiousness	-0.165	0.236		0.171	0.135	-0.305	0.196	0.275	0.187
Agreeableness	0.007	0.286		0.315	0.162	*	0.589	0.242	**
Male	-0.365	0.512		0.783	0.325	**	-0.410	0.431	
Age	-0.035	0.022		0.007	0.013		-0.001	0.018	
Educational year	0.006	0.110		0.047	0.061		0.159	0.098	
Own income	0.000	0.001		0.000	0.000		0.000	0.000	
Number of households	0.114	0.141		0.129	0.099		0.003	0.132	
Non-regular employee	-1.038	0.821		0.287	0.357		0.015	0.516	
Unemployed	-0.683	0.608		0.040	0.323		-0.158	0.474	
Constant	-1.732	2.989		-6.223	1.750	***	-7.050	2.616	***

Table 6 (cont.):

	Venture companies		industries with growth potential		REITs		High-yield bonds	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
Extraversion	0.050	0.192	0.152	0.181	0.045	0.214	0.297	0.537
Neuroticism	-0.035	0.178	0.070	0.171	0.054	0.194	0.265	0.474
Openness to experience	0.432	0.222 *	0.178	0.212	0.285	0.246	0.885	0.584
Conscientiousness	-0.280	0.194	0.275	0.172	-0.175	0.210	-0.395	0.577
Agreeableness	0.345	0.227	0.339	0.221	0.210	0.255	0.541	0.607
Male	0.488	0.448	0.588	0.427	0.163	0.507	0.944	1.092
Age	-0.015	0.017	0.003	0.017	0.004	0.020	-0.023	0.050
Educational year	-0.090	0.085	0.021	0.082	0.042	0.100	-0.385	0.228 *
Own income	-0.001	0.001 *	0.000	0.000	0.001	0.000	-0.003	0.003
Number of households	0.195	0.125	0.114	0.128	0.028	0.143	-1.391	0.650 **
Non-regular employee	0.156	0.486	0.037	0.479	0.326	0.537	1.793	1.287
Unemployed	-0.896	0.520 *	-0.012	0.431	-0.207	0.518	-1.365	1.702
Constant	-2.152	2.390	-7.094	2.296 ***	-5.278	2.708 *	-1.312	6.191

4.2 Reasons to purchase specific assets

4.2.1 Descriptive statistics

In this section, we focus on the reasons why the respondents purchased the stocks they own. Table 7 demonstrates that among the 400 respondents, the most common reason was “Dividend yield was high” (20.25%), and the least common reason was “It was a defined contribution product” (0.75%). So few people chose some reasons that the sample size was not large enough for a regression analysis. Therefore, in the regression analysis in Section 4.2.2, only the following six variables were used as the explained variables: Price would rise (1), Dividend yield was high (2), Shareholder benefits were attractive (3), Risk of bankruptcy was low (4), Historic industry or traditional company (7), and Company I want to support (9).

Table 7. Reasons for buying the stocks you currently own

Reasons	Number of people who chose it
(1) Price would rise	74
(2) Dividend yield was high	81
(3) Shareholder benefits were attractive	75
(4) Risk of bankruptcy was low	61
(5) Companies enthusiastic about ESG	15
(6) New industry or new company	18
(7) Historic industry or traditional company	50
(8) Local company	12
(9) Company I want to support	55
(10) To obtain it as a private placement stock	7
(11) To purchase it through a stock option scheme	10
(12) Recommended by a family member	18
(13) Recommended by a salesperson	12
(14) Defined contribution	3

Note: ESG, environmental, social, and governance

4.2.2 Regression

Table 8 shows the regression analysis results using the six reasons for purchasing stock as the explanatory variables. The reason “Price would rise” was significantly chosen by people with high openness. “Dividend yield was high” was significantly chosen by people with high neuroticism and agreeableness; respondents with high openness also significantly chose this reason, but this was at the 10% significance level. “Shareholder benefits were attractive” was often chosen by people with high neuroticism (1% significance) and agreeableness (10% significance). “Risk of bankruptcy was low”

was chosen by people with high agreeableness at the 10% significance level. The characteristics of people who chose “Historic industry or traditional company” were not related to the Big Five personality traits. People with high openness tend to choose “Company I want to support” at the 10% level. In general, people with high neuroticism tend to choose stocks for reasons such as dividend yield and shareholder benefits. This is consistent with the observations of previous studies that show that people with high neuroticism are reluctant to invest, specifically in long-term investments (Mayfield et al., 2008). High agreeableness also seems to have similar preferences to neuroticism, but the results are not as strong as neuroticism, with a 10% significance level. Openness to experience is associated with reasons such as “Prices will rise” and “Companies I want to support”; this finding indicates that they are positive about investing and enjoy it.

Table 8. Estimation results for the reasons for buying the stocks you currently own

	(1) Price would rise			(2) Dividend yield was high			(3) Shareholder benefits were attractive		
	Coef.	Std.		Coef.	Std.		Coef.	Std.	
Extraversion	-0.146	0.168		-0.128	0.168		-0.095	0.165	
Neuroticism	0.011	0.155		0.414	0.168	**	0.518	0.166	***
Openness to experience	0.398	0.196	**	0.336	0.198	*	0.139	0.190	
Conscientiousness	0.005	0.163		0.248	0.161		-0.107	0.163	
Agreeableness	0.274	0.200		0.538	0.208	***	0.363	0.192	*
Male	1.050	0.435	**	0.871	0.428	**	0.789	0.411	*
Age	0.009	0.016		0.043	0.017	***	0.023	0.016	
Educational year	0.000	0.074		0.044	0.076		-0.007	0.072	
Own income	0.000	0.000		0.000	0.000		0.000	0.000	
Number of households	0.166	0.119		0.344	0.124	***	0.118	0.119	
Non-regular employee	-0.144	0.487		0.197	0.458		0.328	0.416	
Unemployed	0.532	0.380		0.519	0.389		-0.181	0.399	
Constant	-5.746	2.066	***	-12.590	2.356	***	-6.901	2.177	***

Table 8 (cont.):

	(4)	Risk of bankruptcy was		(7)	Historic industry or		(9)	Company I want to	
	low			traditional company			support		
	Coef.	Std.		Coef.	Std.		Coef.	Std.	
Extraversion	-0.184	0.181		0.328	0.204		-0.081	0.191	
Neuroticism	0.209	0.172		0.156	0.185		-0.057	0.172	
Openness to experience	0.250	0.211		0.350	0.235		0.383	0.222	*
Conscientiousness	0.215	0.172		0.015	0.190		0.106	0.184	
Agreeableness	0.414	0.213	*	0.303	0.250		0.192	0.225	
Male	0.924	0.478	*	0.503	0.496		0.873	0.507	*
Age	0.031	0.017	*	0.043	0.020	**	0.007	0.018	
Educational year	0.044	0.080		0.044	0.095		-0.004	0.085	
Own income	0.000	0.000		0.000	0.000		0.000	0.000	
Number of households	0.011	0.138		-0.003	0.147		-0.116	0.145	
Non-regular employee	-0.241	0.496		0.348	0.498		0.416	0.484	
Unemployed	0.070	0.410		-0.205	0.468		0.082	0.444	
Constant	-8.775	2.346	***	-10.433	2.691	***	-5.269	2.336	**

5. Conclusion

This study conducted a questionnaire survey that asked detailed questions regarding investment behavior and the reasons for it. We noticed that Big Five personality traits have an effect on investment behavior. Initially, this study clarified individual preferences regarding their investment behavior by asking hypothetical questions about what type of investment they would make if they had extra money. The results showed that investment preferences differed depending on the respondents' Big Five personality traits. Overall, respondents with high openness were more positive about investing. Respondents with high openness also had a greater number of financial assets they wanted to invest in than those with low openness. This is a reasonable result, because high openness is associated with a preference for new and unusual things. Respondents with high neuroticism, who are generally more sensitive to risk and cautious, prefer relatively low-risk bonds, which is also consistent with the Big Five personality traits. The fact that people with high levels of conscientiousness, who prefer things to go according to plan, avoided actively managed investment trusts with large price fluctuations is also consistent with the Big Five personality traits.

Our subsequent analysis was to correlate the reasons for purchasing stocks currently held with the Big Five personality traits. Respondents with high openness bought stocks for reasons such as “The price will rise” and “The company I want to support.” From this, we can also infer that high openness is related to a positive attitude toward investment and enjoying investing. Respondents with high neuroticism tended to choose stocks for reasons such as “Dividend yield” and “Shareholder benefits”; therefore, we can further infer that they invest with a short-term perspective.

This study aimed to gain insights that could be employed to encourage people to start investing by focusing on Big Five personality traits as a determinant of investment behavior. If it becomes clear what kind of personality individuals have and what kind of investment they prefer, it will be possible to make proposals that match individual preferences, and this will lower the barrier to opt for investment.

One way of intervening to promote investment is through nudges. Nudges are a concept proposed by behavioral economics and are interventions that “gently nudge” people toward a desirable option while leaving them free to make their own choice. In recent years, nudges have been actively used in government and municipal initiatives.

Research on nudges has been conducted in several fields. Various studies have demonstrated the usefulness of personalized nudges. For example, Peer et al. (2020) examined interventions to help people create robust passwords based on their personality traits; their results showed that personalized nudges had a significantly greater improvement effect than nudges that were not provided or those that were not personalized. One study (Hirsh et al., 2010) used personalized nudges based on Big Five personality traits. They prepared promotional messages for a fictional product, Xphone, for each of the Big Five personality traits and looked at their effectiveness. For example, the message for people

with high extraversion was “XPhone is the result of everything they’ve learned so far, a phone designed for strong, active, outgoing people like you.” The message for people with high emotional instability was “XPhone is the result of everything they’ve learned so far, a phone that will keep you safe.” Messages that matched respondents’ Big Five personality traits, significantly increased their desire to purchase the product.

This study’s findings can be used to design similar personalized nudges. The simplest approach is to send personalized messages based on the Big Five personality traits; however, this can also be applied to investment education. For example, people with high openness who enjoy investing may be more likely to invest with a simple nudge, whereas people with high neuroticism would need a system that allows them to invest over the long term, or they may need to have their investment fears and anxieties removed through investment education. Although personality traits other than risk aversion have not been considered much in personal finance research until now, this is likely to become an increasingly important perspective in the future.

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Appendix 1: Questionnaire

Q. Please select all the financial assets that you have purchased within the last five years.

Moreover, answer all the questions that apply to the financial assets that you currently hold.

*Mutual funds include those purchased through corporate-type and individual-type defined contribution pension plans, as well as individual-type defined contribution pension plans (iDeCo).

*Please include ETFs in the investment trust category.

*For financial products such as savings accounts that are shared by family members and it is difficult to determine your share, please answer what you think is your share. Please also answer what you have decided to purchase.

- Stocks (individual stocks)
- Government bonds
- Corporate bonds
- Mutual funds (including real estate investment trusts [REITs])
- Futures and derivative products
- Foreign currency (including foreign currency deposits and FX)
- Precious metals such as gold and platinum among real assets
- Cryptocurrencies
- Savings-type insurance (educational insurance, annuity insurance, endowment insurance, life insurance with savings, etc.)
- Other
- I have not purchased financial assets in the last five years/I do not currently hold any financial assets

Q. Please recall up to 10 of the stocks you own that you made a decision to buy.

Please give them initials or pseudonyms so that you can identify them in the questions that follow. It is fine if only you can understand them.

*Please do not include stocks acquired through investment in a joint-stock company you established.

Q. For those who own stocks (individual stocks), please indicate where the following stocks are listed.

Please answer for each stock you wrote the name of in the previous question.

- Tokyo Stock Exchange, 1st Section
- Tokyo Stock Exchange, 2nd Section

- Mothers
- JASDAQ
- Nagoya Stock Exchange, 1st Section
- Nagoya Stock Exchange, 2nd Section
- Nagoya Stock Exchange, Centrex
- Sapporo Securities Exchange, Main Market
- Sapporo Securities Exchange, Ambitious
- Fukuoka Stock Exchange Main Market
- Fukuoka Stock Exchange Q-Board
- Other domestic markets
- Overseas markets (developed countries)
- Overseas markets (emerging countries)
- Unlisted

Q. Please select all the reasons that apply to why you bought the stocks.

Please answer for each stock you have named.

- I thought the price would rise significantly in the future
- The dividend yield was high
- The shareholder benefits were attractive
- I thought the risk of bankruptcy or a large price drop was low
- The company is one that manages its business with consideration for environmental, social, and governance (ESG)
- It is a stock of a new industry or new company
- It is a stock of a historic industry or traditional company
- It is a stock of a local company
- It is a stock of a company I want to support
- I had the opportunity to obtain it as a private placement stock
- I had the opportunity to purchase it through a stock option scheme or employee stock ownership plan
- It was a stock recommended by a family member or acquaintance
- It was a stock recommended by a salesperson or investment advisor
- It was a product offered for purchase through a defined contribution pension plan
- Other

Q. For those of you who have mutual funds, please recall up to five of the mutual funds you have

that you made the decision to buy.

Please give them initials or pseudonyms so that you can identify them in the questions that follow. It is fine if only you can understand them.

Q. Please answer all the following questions about the mutual funds you have.

Answer for each investment trust you have named.

- Domestic stocks
- Domestic bonds
- Developed country stocks
- Developed country bonds
- Emerging country stocks
- Emerging country bonds
- REITs
- Other

Q. Are the following mutual funds index funds or active funds?*

Answer for each investment trust you have written down.

*Index funds are funds that aim to achieve investment results that move in the same way as market averages and indices (benchmarks), such as the Nikkei Stock Average, TOPIX and S&P 500. An active fund is a fund that aims to achieve investment results that exceed the performance of market indices, through the unique stock selection and asset allocation of the fund manager and other investment managers.

- Active fund
- Index fund

Q. Please select all the reasons that apply to why you bought the following mutual funds.

Please answer for each investment trust you have named.

- I thought the price would rise significantly in the future
- I thought the risk due to market trends, corporate performance, exchange rate fluctuations, and so on was small
- The trust fee (commission) was low
- It was a fund with a good track record in the past
- It selects stocks and bonds of companies that take ESG into consideration

- It is a fund that includes new industries and new companies
- It is a fund that includes traditional industries and companies with a long history
- I had the opportunity to buy it through a hedge fund
- It was a product recommended by a family member or acquaintance
- It was a product recommended by a salesperson or financial advisor
- Other

Q. Please enter the year (AD) in which you first bought the following mutual funds.

Answer for each investment trust you have named.

Q. How often do you check or review the allocation of your assets?

- Once a week
- Once every half month
- Once a month
- Once every three months
- Once every six months
- Once a year
- Once every few years
- When I buy or sell
- I do not do it regularly

Q. Suppose you have some extra money and decide to buy a financial product.

Please tell us how much importance you would place on the following points when making a purchase.

“Very important”

“Somewhat important”

“Not very important”

“Not important at all”

- (1) The minimum transaction unit (amount) is small
- (2) The sales commission and trust fees are low
- (3) All the procedures involved in making a purchase (opening an account, buying and selling, etc.) can be done online
- (4) The product is eligible for tax benefits (iDeCo, NISA, NISA for Savings, etc.)
- (5) The product has a guaranteed principal

(6) The product has high liquidity (you can buy and sell the desired quantity at any time)

Q. Suppose you have some extra money and you want to buy a financial product, which financial product would you choose?

Please select all the products you would like to buy. If none of the following options appeal to you, please indicate what you would choose if you had to.

- Stocks (individual stocks)
- Government bonds
- Mutual funds (index funds)
- Mutual funds (active funds)
- Futures and derivative products
- Foreign currency (including foreign currency deposits and FX)
- Precious metals such as gold and platinum among real assets
- Cryptocurrencies

Q. Suppose you have some extra money and you decide to buy stocks or mutual funds.

Please answer all the questions about the characteristics of the companies you would consider investing in.

*If none of the following options appeal to you as potential investments, please answer the questions anyway.

- [Domestic] Listed companies
- [Developed countries] Listed companies
- [Emerging countries] Listed companies
- [Domestic] Unlisted companies
- [Developed countries] Unlisted companies
- [Emerging countries] Unlisted companies
- [Domestic] Companies with high dividend yields
- [Developed countries] Companies with high dividend yields
- [Emerging countries] Companies with high dividend yields
- [Domestic] Companies that are proactive in their efforts to achieve the SDGs (e.g., introducing clean energy)
- [Developed countries] Companies that are proactive in their efforts to achieve the SDGs (e.g., introducing clean energy)
- [Emerging countries] Companies that are proactive in their efforts to achieve the SDGs (e.g., introducing clean energy)

introducing clean energy)

- [Domestic] Large companies with a long history
- [Developed countries] Large companies with a long history
- [Domestic] Good venture, small and medium-sized enterprises
- [Developed countries] Good venture, small and medium-sized enterprises
- [Emerging countries] Good venture, small and medium-sized enterprises
- [Domestic] Industries with growth potential and emerging industries (semiconductors, information and communication technology, etc.)
- [Developed countries] Industries with growth potential and emerging industries (semiconductors, information and communication technology, etc.)
- [Emerging countries] Industries with growth potential and emerging industries (semiconductors, information and communication technology, etc.)
- [Domestic] REITs
- [Developed countries] REITs
- [Emerging countries] REITs
- [Domestic] High-yield bonds (junk bonds)
- [Developed countries] High-yield bonds (junk bonds)
- [Emerging countries] High-yield bonds (junk bonds)

Q. What percentage of your household income do you spend each month on the purchase of risky financial products?

Please answer this question by taking an average over the last five years.

*Risky financial products include stocks, government bonds, mutual funds, futures and derivatives, foreign currency (including foreign currency deposits), precious metals such as gold and platinum, and cryptocurrencies. Mutual funds also include those purchased through corporate-type and individual-type defined contribution pension plans, and individual-type defined contribution pension plans.

- 1%–10% or less
- 10%–20% or less
- 20%–30% or less
- Less than 30%–50%
- 50% or more
- I do not spend money on risky financial products
- I do not have any relevant income

Q. What percentage of your monthly income do you spend on risky financial products?

Q. What percentage of your bonus do you spend on risky financial products?

Q. How much do each of the following statements apply to you?

Please rate to what extent the following traits apply to you, from “Very much” to “Not at all.”

“Very much”

“Quite a bit”

“A little”

“Neither”

“Not much”

“Hardly at all”

“Not at all”

(1) I like talking

(2) I am quiet

(3) Cheerful

(4) Outgoing

(5) Sociable

(6) Prone to anxiety

(7) Worried

(8) Easily discouraged

(9) Easily nervous

(10) Depressed

(11) Original

(12) Talented

(13) Progressive

(14) Quick-witted

(15) I have a wide range of interests

(16) I am very curious

(17) I am careless

(18) I am sloppy

(19) I am lazy

(20) I leave things to chance

(21) I am organized

- (22) I am easily distracted
- (23) I am methodical
- (24) I am gentle
- (25) I am short-tempered
- (26) I am quick to anger
- (27) I am generous
- (28) I am kind
- (29) I am self-centered

Q. How much is your annual income (including tax)?

- Less than 1 million yen
- 1–2 million yen
- 2–3 million yen
- 3–4 million yen
- 4–5 million yen
- 5–7 million yen
- 7–10 million yen
- 10–15 million yen
- 15–20 million yen
- 20 million yen or more
- Do not know/Do not want to answer

Q. How many people live in your household?

- 1 person (single-person household)
- 2 people
- 3 people
- 4 people
- 5 people
- 6 people
- 7 people
- 8 people
- 9 or more

Q. What is the total annual income (including tax) of all the members of your household?

- Less than 1 million yen
- 1–2 million yen
- 2–3 million yen
- 3–4 million yen
- 4–5 million yen
- 5–7 million yen
- 7–10 million yen
- 10–15 million yen
- 15–20 million yen
- 20 million yen or more
- Do not know/Do not want to answer

Q. Please describe your relationship to the head of the household.

- Head of the household
- Spouse of the head of the household
- Child of the head of the household
- Parent of the head of the household
- Other than the above

Appendix 2

Table A1. Descriptive statistics of socio demographic variables

Category of variables	Options	N	%
Years of education	Junior high school	5	1.25
	High school	79	19.75
	Junior college, technical college, vocational school	71	17.75
	4-year university	208	52
	Graduate school	37	9.25
Own income	Less than 1 million yen	67	17.96
	1–2 million yen	45	12.06
	2–3 million yen	40	10.72
	3–4 million yen	49	13.14
	4–5 million yen	42	11.26
	5–7 million yen	50	13.4
	7–10 million yen	49	13.14
	10–15 million yen	22	5.9
	15–20 million yen	5	1.34
	20 million yen or more	4	1.07
Household income	Less than 1 million yen	6	2.03
	1–2 million yen	10	3.39
	2–3 million yen	21	7.12
	3–4 million yen	29	9.83
	4–5 million yen	33	11.19
	5–7 million yen	59	20
	7–10 million yen	70	23.73
	10–15 million yen	40	13.56
	15–20 million yen	19	6.44
	20 million yen or more	8	2.71
Number of people in your household	1 person	71	17.75
	2 people	146	36.5
	3 people	104	26
	4 people	58	14.5
	5 people	15	3.75
	6 people	2	0.5

	7 people	3	0.75
	8 people	0	0
	9 people or more	1	0.25
Percentage of monthly income spent on purchasing risky financial products	I do not spend any money on purchasing risky financial products	106	35.93
	1–10%	103	34.92
	10–20%	53	17.97
	20–30%	14	4.75
	30–50%	7	2.37
	50% or more	12	4.07
Occupation	Company owner/executive/organization executive	25	6.25
	Company employee/organization staff (full-time employee, teacher)	132	33
	Company employee/organization staff (temporary/contract employee)	27	6.75
	Self-employed/sole proprietor/freelance	44	11
	Freelance (e.g., medical practitioner, lawyer)	4	1
	Public servant	13	3.25
	Student	0	0
	Full-time housewife/househusband	39	9.75
	Part-time/temporary/freelance worker	31	7.75
	Unemployed/on leave/looking for work	31	7.75
	Living on a pension	52	13
	Other	2	0.5