

Financial Knowledge and Financial Behavior: Does Consumer Personality Matter? Analysis based on CFPS

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Abstract

Consumer financial knowledge and personality traits are important variables that affect consumer financial behavior. This paper studies the impact of financial knowledge on consumer financial decision from the perspective of consumer psychology and individuality, and discusses the moderate effect of consumer's personality heterogeneity on the relationship between the Big Five personality traits. According to CFPS2014 (China Family Panel Studies 2014) survey data, the proposed assumptions are verified one by one. This study indicates that financial knowledge has a significant negative impact on financial investment behavior. Agreeableness and openness personality traits can positively regulate the relationship between financial knowledge and financial investment behavior, and rigor, extraversion and neuroticism can not significantly adjust the level of financial knowledge and the relationship between financial investment behavior. By introducing the adjustment variables of personality traits and breaking through the previous research on the direct relationship between financial knowledge and financial behavior, this paper has important practical significance to guide consumers' financial behavior and consumer education.

Keywords

Financial Knowledge; Big-Five Personality Trait; Financial Behavior; Consumer Personality; CFPS2014.

1. Introduction

In some countries such as Europe, America and Australia, there is a prevailing low level of financial knowledge (OECD, 2005; Lusardi & Mitchell, 2011; Raaij, 2016). The economic impact of this kind of defect is getting more and more attention in the field of public policy. In order to seek inefficient remediation of personal financial behavior, many studies investigated the factors that influence personal financial behavior. The economic literature tends to focus on the connection between financial knowledge and personal financial behavior. Good financial behavior is positively correlated with high levels of financial knowledge, financial education and experience also positively influence financial knowledge and behavior (Lyons, Chang and Scherpf, 2006). On the other hand, psychologists emphasized the importance of considering psychological reasons to explain financial behavior (Raaij, 2016; Brown, Ghosh and Taylor, 2014), but the existing research is limited to the association between financial knowledge and financial behaviors, psychological variables are not included in the research model, thus hindering the universality of research (Yurchisin and Johnson, 2004). Recent studies have shown that individuals with high levels of financial knowledge may not have a positive self-perception of his knowledge level and may not take the right approach to dispose of his assets (Parker, 2012). That is, individuals with the same level of financial knowledge may show significant differences in financial decision making due to their heterogeneity in personality. Will consumer education programs that educate consumers on general financial education and

raise their financial knowledge really change consumer financial behavior? This study will use a nationally representative data set of the China Family Panel Studies (CFPS) to research the strength of the relationship between financial knowledge and financial behavior, and to focus on individual personality traits in the model to verify the degree of influence of different personality traits on the relationship.

2. Literature Review

2.1. Financial Knowledge and Financial Behavior

Financial knowledge is the information that can be stored in memory to learn, organize, and represent (Alba and Hutchinson, 1987). Investors can search, use and update their financial knowledge, and reason or explain their financial decisions. Knowledgeable investors can deal with investment-related financial information effortlessly. They use financial knowledge to process information and make decisions by matching newly-acquired information with their own financial knowledge, rather than relying solely on individual preference. Those who have insufficient knowledge of financial products are more likely to purchase unmatched financial products. Financial education and experience positively influence financial knowledge and thus influence financial behavior (Lyons et al., 2006). Hilgert, Hogarth and Beverly (2003) found that people's financial knowledge in some particular field is positively related to the financial practice in this field. In addition, relevant studies have found that financial literacy is associated with wealth accumulation, and financial education can help achieve economic growth (Teodora, Xose and Mădălina, 2022). Lusardi, Mitchell, and Curto (2010) from surveys of US consumers related studies concluded that the level of financial knowledge is generally low. Most respondents believe that they should have a good understanding of their personal financial situation. However, they cannot correctly answer the questions related to personal financial interest rates, inflation, credit, savings, etc. The premise of most financial education programs is that improving people's financial knowledge is conducive to making improved financial decisions. That is, financial knowledge is positively related to responsible financial behavior. They also found that financial knowledge based on social demographic characteristics and financial complexity of households differ greatly. Compared with a female ungraduated from high school whose parents have no assets, a college-educated male whose parents own stocks and pensions may be more than 45% aware of risk diversification. In addition, people with lower levels of financial knowledge are more likely to have debt problems, less likely to participate in the stock market, and less likely to accumulate wealth and effectively manage wealth (Van Rooij, Lusardi and Alessie, 2012). Thus improving financial literacy and skills are beneficial to financial behavior. Hilgert et al (2003) discovered the positive relationship between financial knowledge and financial behavior (practice). Heo Wookjae, Abed and Lee (2021), who have found different levels of financial risk tolerance will show different levels of equity investment. Shehata et al (2021) studied the regulatory effect of the relationship between risk perception in the financial market and the stock market and the willingness to invest in the stock market, and found that in the formation process of financial knowledge, the total effect of subjective knowledge is greater than the total effect of objective knowledge. There is a positive relationship between financial knowledge and perceived risk, and financial knowledge and investment willingness. Related studies also found that both education and financial knowledge contribute positively to consumers' confidence in financial goals, with more educated and richer financial knowledge having more confidence in financial goals (Chen, Han and Ma, 2020). YULIANI (2019) analyzed the relationship between financial knowledge on financial literacy, and pointed out that financial knowledge has a direct impact on financial literacy, and the indirect influence of financial behavior on financial literacy is not significant, so financial behavior is not an intermediary variable. Xu, Zhen, Ali, Li and

Cui(2022)found that financial knowledge is an important factor in shaping and improving financial behavior. Secondly, financial knowledge can improve residents' limited attention, residents with high attention tend to have formal bank accounts, participate in the stock market and engage in financial behaviors in risk financial markets.

2.2. Personality and Financial Behavior

On investment issues, the economists' research tends to be general, while the psychologists' usually focuses on individuals. If differences exist among people with different behaviors, the overall relationship may be misleading. The personal factors mainly involve the social population variables. We will focus on the influence of personality factors.

In a sub-discipline of psychology named personality psychology, personality is considered to be a determinant of the criticality of human behavior and performance (Buss, 1992) . Personality is stable in all situations, it can explain and predict human behavior to some extent. The researchers believe that the five significant personality variables outperform other personality variables. These personality variables are summarized as "Big Five" personality (Norman,1963; Barrick and Mount, 1991), which are extraversion: good at communication, clustered, performance, need motivation, seeking stimulation; neuroticism: trait anxious, depressed, anxious, and insecure; agreeableness: cute, friendly, trustworthy, and tolerant to others; conscientiousness: plan, responsibility; openness: the need for motivation and impulsivity. Krishnan and Beena(2009)conducted a large-five personality analysis on investors and found that extraversion is positively related to the trend of financial behavior and openness is negatively related to it. Almlund, Duckworth,Heckman and Kautz(2011)show through the theoretical model analysis that labor wage budget income is restricted by individual personality characteristics, and individuals with strong dedication and positive, optimistic and cheerful mood can bring higher labor productivity and then improve family income. Buccioli and Zarri (2017) used the US Health and Retirement Study (HRS) data and found that rigor, extroversion and neurotic personality traits have significant negative associations with investors' portfolio choices, mainly showing differences in family stock holdings and holding types compared with other personality traits. In terms of venture capital, people with these three personality characteristics tend to know more about how to avoid risks and reduce asset investment risks.Selin,Mehmet and Azize(2017)analyzed the performance of fund managers and found that high exteaversion and agreeableness have a positive effect on the financial performance of fund managers. Based on the Big Five personality model, analyzed the relationship between demographic variables such as age and investment decisions, and found that personality traits have more significant influence on investment decisions than demographic variables. Mayfield et al(2008) used the Big Five personality framework to describe the relationship between investors' personality traits and their investment behavior. They found that individuals with highly openness are more likely to make short-term investments. High neuroticism personality traits can make them nervous and anxious, and not invest in long-term investments, neither of these personal characteristics will affect long-term investment willingness, but agreeableness has no effect on investment willingness.Brown and Taylor (2014)analyzed UK household data and found that found that different dimensions of personality traits have a significant differential impact on household financial behavior, with openness personality traits positively influencing household stock investments and cisgender personality traits negatively influencing stock investments.

Salgado (1998)believed that this anxious temperament may affect investment behavior. Therefore, neuroticism makes it easy for investors to show excessive trading, short-term trading, etc. in their investments. On the other hand, high extraversion will make individuals more prone to stimuli and risk, more vitality and dominance, and more able to experience positive emotions, they may be overconfident and excessive trading. Individuals with a higher

degree of openness are more likely to be challenged and new, and there may be overconfident and excessive transactions. Agreeableness personality mainly determines the attitude toward others, Mayfield (2008) also proved that this personality has no effect on investment willingness, while Nicholson, Soane and Fenton (2005) proved that the individual's overall adventurousness across different areas of life is negatively correlated with agreeableness, and the people with low agreeableness are more competitive. This kind of competitiveness may make it appear unconventional behavior when making investment decisions.

2.3. Personality, Financial Knowledge and Investment Behavior

Among the many factors affecting financial behavior, financial knowledge is such a significant predictor, and personality traits will also affect investment behavior. In addition, the researchers also found that individuals with different personality traits may aggravate or reduce the frequency and intensity of financial behavior. However, there are only few researches on financial personality and financial behavior in individual personality trait variables. And most researches will focus on the main effect test of Big Five personality, ignoring the moderating effects of personality traits. This research aims to explain that the different personality traits of investors may affect the effectiveness of their financial knowledge, thus affecting their financial decisions. In this study, we will combine relevant literature on financial knowledge and financial behavior to analyze the situation in which financial knowledge related to investment decisions is influenced by the personality characteristics of individual investors.

2.3.1. Extraversion

Extraversion reflects people's vibrant and social personality. Highly extraversion individuals are adventurous and confident (Costa, McCrae and Robert, 1992). Their talkativeness and extraversion is inherent, and there is a solid relationship between extraversion and awakening, and therefore build a connection between seeking stimuli and risk-taking (Lauriola and Levin, 2001). High-stimulus seekers have a very high demand for awakening, and therefore, they tend to take more and more risks than low-stimulus seekers (Wong and Carducci, 1991), such as investing and speculation, seeking stimuli and extraversion may directly affect financial risk behavior, or indirectly influence financial risk behavior through risk propensity. Individuals with extraversion personality are more likely to be overconfident, and this leads to excessive trading by investors (Barber and Odean, 2001), so their transaction frequency is higher. They like to get information and are willing to actively use their own experience and knowledge to solve their own financial problems, easy to have a high financial knowledge. Outgoing investors can get a lot of information from existing media, such as social networking resources, and have more confidence in investment decisions (Pompian and Longo, 2004), so they will easily generate financial transactions.

2.3.2. Neuroticism

Individuals with neurotic symptoms may experience negative emotions such as anxiety, depression, stress, anger and fear. Neuroticism is a personality trait that reflects emotional instability and is associated with negative emotions, such as the sensitivity and negative evaluation of negative information (Yang, Yu, Wang and Qiu, 2021). High neuroticism leads individuals to actively acquire a large amount of information and want to understand everything they do to ensure that they understand every important aspect of the situation (Nichols et al, 2005). They believe that the richer and safer the knowledge is, the easier it is to obtain satisfactory decision-making results. High neuroticism individuals are prejudiced against dangerous information, which may be a cause of risk perception bias (Gasper and Clore, 1998). Durand, Newby, Tant and Trepongkaruna (2013) studied in experiments simulating the foreign exchange market and found that there is a negative correlation between neuroticism and financial transactions. However, individuals with high neuroticism are sensitive to stimuli

in the environment and are overreacted in normal circumstances. These stimuli may increase their sense of tension, thereby affecting the possibility of treating the trading behavior of financial products as a means of reducing unpleasant sensations. Therefore, we assume that highly neurotic investors trade more.

2.3.3. Agreeableness

The individuals with agreeableness are friendly and tolerant to others. Highly agreeableness individuals are more willing to trust others than low agreeableness individuals, and trust makes people more receptive to financial advice. Compliance is the behavior or attitude consistent with the object for the expectation of the object by the generalization, judgment and reasoning about the object's behavior or attitude (Zou,2007).They are often naive, reluctant to think independently, have no knowledge of the financial knowledge they possess, even if having a high level of financial knowledge, it is not easy to participate in financial transactions and are willing to believe others, and therefore they are often misled by others (Costa et al,1992). Highly agreeableness individuals are often prone to believing information without criticism. They have little curiosity and judgment, so they may over-market and over-trade.

2.3.4. Conscientiousness

Conscientiousness reflects people's self-discipline, effective and responsible tendencies. Conscientiousness individuals tend to be goal-oriented and actively participate in decision-making. They will not give up until the goal is achieved, no matter how much time and energy is here (Costa et al, 1992). Their financial behavior is more planned and more responsible. They are more likely to make thoughtful and prudent financial decisions, and they are very concerned with high-quality knowledge and information related to financial decision-making. Only the knowledge and information that satisfying their needs can make them satisfied. When highly cautious investors have relatively reliable and relevant financial information, they will actively work for the highest output. Donnellv, Iver and Howell (2012) use the Big Five personality theory to establish measures of personality characteristics to study the impact of personality characteristics on family savings. The results show that individuals with higher rigorous personality characteristics scores can better perform wealth management, and they are more inclined to save to obtain a stable income. Yang, Hsu and Tu (2012) studied the moderating effect of extraversion personality and strict personality in investor confidence and trading volume. The results show that different personality traits have the same performance of trading behavior after coaching and training.

2.3.5. Openness

Openness is the personality dimension that determines individual's cognitive style, ability to accept and curiosity for strange situations and new things. Openness will enable individuals to break through tradition, become interested in art, and have the ability to analyze information. It drives individuals to pursue curious, novel, non-traditional, and creative things. Highly openness individuals are more creative, and glad to find and experiment with new products experiences, and are more likely to try new financial products and services. They have a natural curiosity that helps them bring new experiences and perspectives (Costa et al, 1992). Highly openness individuals are more inclusive to the financial knowledge and information, and use these financial knowledge and information as much as possible for decision-making. They take risks but may have higher returns on investment. High impulses can cause carelessness in decision making and can also lead to improvisational purchases. Individuals are more adventurous when they are highly impulsive because they do not need to consider all alternatives available. They want to make quick decisions to enjoy the benefits of their own choices, in order to avoid trade-offs caused by unhappy feelings, or to avoid the opportunity cost of information processing. Impulse has two high-level personality trait indicators: openness and agreeableness. Individuals with high impulsivity have low agreeableness and are

more open to new things. Openness is related to the awakening of demand and therefore leads to risk seeking behavior. High compliance is also relevant to the processing of alternative information, focusing on most of the identified options, thus implementing prudent risk management.

3. Models, Data and Variables

3.1. Model

The goal of this paper is to study the relationship between financial knowledge, personality traits, and financial behavior. Specifically, we will examine the role of financial knowledge when consumers invest in stock assets, and in particular discuss the moderating effects of personality traits on this relationship. On the basis of the above literature analysis, a research model is proposed as shown in Figure 1.

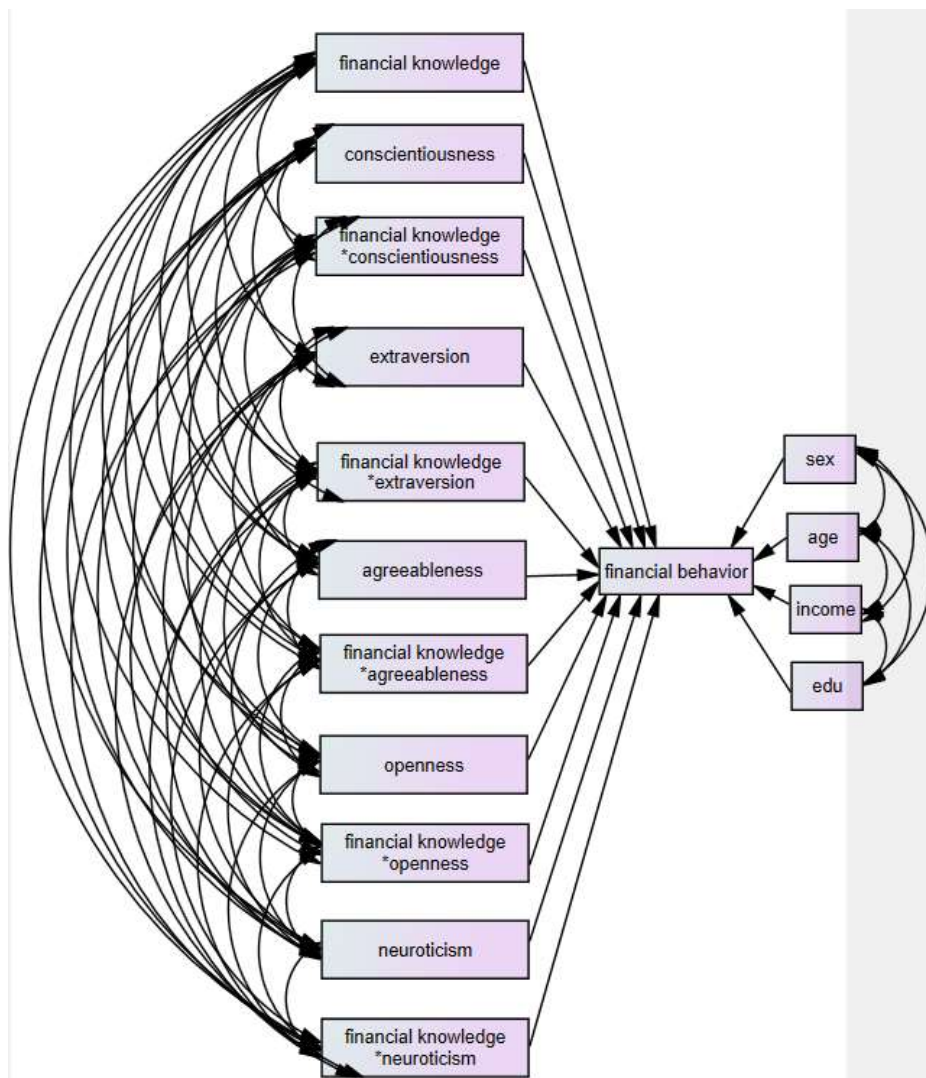


Figure 1. Concept model

H1: Higher conscientiousness positively moderate the relationship between financial knowledge and financial behavior.

H2: Higher extraversion positively moderate the relationship between financial knowledge and financial behavior.

H3: Higher agreeableness negatively moderate the relationship between financial knowledge and financial behavior.

H4: Higher openness negatively moderate the relationship between financial knowledge and financial behavior.

H5: Higher neuroticism positively moderate the relationship between financial knowledge and financial behavior.

3.2. Data

This study uses the data from the China Family Panel Studies (CFPS) survey published by the China Social Science Survey Center (ISSS) of Beijing University. The CFPS sample covers 25 provinces, municipalities, and autonomous regions. The target sample size is 16,000 households. It eventually obtains three levels of data: individuals, families, and communities, reflecting the changes of social economy, population, health, and education aspects of China. The data provided has become the most important data source for the study of Chinese families. This article will use the latest survey data for CFPS (2014) to conduct a study to measure the household characteristics.

3.3. Variables

Table 1. The problem of measuring the "big five" personality in the CFPS (2014) questionnaire

| Personality dimension | Questionnaire in CFPS (2014) | Indicator instructions |
|-----------------------|---|--|
| conscientiousness | Clothing cleanliness | 1-7 for very bad to very good |
| | Home cleanliness | 1-7 for messy to tidy |
| | Respondents' doubts about the survey | 1-7 for very low to very high |
| extraversion | Ways of Treating People | 1-7 for very bad to very good |
| | The importance of having fun in life | 1-7 for very bad to very good |
| agreeableness | Trust in strangers | Minimum 0,10 |
| | Get along with people | Minimum 0,10 |
| | The degree of importance that is not annoying | Minimum 0,10 |
| openness | Interest in the survey | 1-7 for very low to very high |
| | Have at least one son | 1-5 for strongly agree to strongly disagree |
| neuroticism | Restless, difficult to calm | 1-5 are almost every day, often, half the time, some time, never |
| | Frustrated, depressed, unpleasant frequency | 1-5 are almost every day, often, half the time, some time, never |
| | The frequency of doing anything difficult | 1-5 are almost every day, often, half the time, some time, never |

In the family questionnaire of the 2014 CFPS questionnaire, it was selected: " Does your family now hold the following financial products?"The question is taken as a measurement variable of whether residents have financial behavior. For this question, the questionnaire answer is set up for stocks, funds, Treasury bonds, trust products, foreign exchange products, other financial assets and the above are not available as options.The variable of financial knowledge is mainly measured from the dimensions of computing power, the understanding of inflation, the time

value of money and the investment risk. From the family database, "What do you estimate is the interest rate of the one-year time deposit in the bank now?" "Suppose you have a 1-year term deposit of 10,000 yuan with an annual interest rate of 3%. If you don't withdraw it in advance, how much money will you have when the deposit is due?" "The deposit in the above account is fixed for another year after maturity, and the interest rate remains unchanged. How much money is there in the account after one year?" "If the deposit rate in your bank account is 3% annually and the inflation rate is 5% per year, how much can you buy with the money in your account a year later?" "Suppose Zhang SAN inherited 10 0,000 yuan today, while Li Si will inherit 10 0,000 yuan in three years. So, who two of them has more inheritance value?" "Generally, high-yield investments have high risk." "In general, investing in a single stock is less risky than investing in an equity fund." And other seven topics to measure the level of financial knowledge. For the measurement of personality characteristics, referring to the big five personality measurement index of Li and Zhang (2015) analysis on the impact of household owners' personality characteristics on family stock investment, according to the latest CFPS questionnaire data, 13 variables were selected to measure the personality characteristics of household owners. Details in Table 1.

4. Analysis of Empirical Results

4.1. Big Five Personality Confirmatory Factor Analysis

The confirmatory factor analysis was used to test the goodness of fit of the Big Five personality measurement variables in order to more clearly define the fit of the model.

According to the confirmatory factor analysis, the adaptability summary of relevant indicators was obtained, in which NFI=0.884, RFI=0.808, IFI=0.888, TLI=0.814, CFI=0.888, and RMSEA value was 0.026, less than 0.05, indicating the model Can meet the standard of adaptation, and then show that the Big Five personality model and the existing data is a good fit.

4.2. Structural Equation Model Analysis

Table 2. Results of the model regression for the structural equations

| | | Estimate | S.E. | C.R. | P | Label |
|--------|---------------------------|----------|-------|--------|-------|-------|
| Y <--- | financial knowledge (KL1) | -0.102 | 0.052 | -1.967 | 0.049 | |
| Y <--- | conscientiousness (Q1) | 0.004 | 0.011 | 0.411 | 0.681 | |
| Y <--- | Q1KL1 | 0.005 | 0.01 | 0.5 | 0.617 | |
| Y <--- | extraversion (Q2) | -0.015 | 0.011 | -1.418 | 0.156 | |
| Y <--- | Q2KL1 | -0.002 | 0.01 | -0.193 | 0.847 | |
| Y <--- | agreeableness (Q3) | 0.015 | 0.011 | 1.349 | 0.177 | |
| Y <--- | Q3KL1 | 0.023 | 0.01 | 2.234 | 0.025 | |
| Y <--- | openness (Q4) | 0.022 | 0.006 | 3.439 | *** | |
| Y <--- | Q4KL1 | 0.021 | 0.006 | 3.382 | *** | |
| Y <--- | neuroticiam (Q5) | 0.019 | 0.008 | 2.248 | 0.025 | |
| Y <--- | Q5KL1 | 0.007 | 0.008 | 0.961 | 0.337 | |
| Y <--- | sex | -0.022 | 0.011 | -1.978 | 0.048 | |
| Y <--- | age | 0.003 | 0 | 7.081 | *** | |
| Y <--- | income | 0 | 0 | 7.024 | *** | |
| Y <--- | edu | 0.02 | 0.004 | 5.396 | *** | |

We analyzed the path of structural equation model using Amos to calculate the goodness of fit for all relevant indicators. Among them, NFI=0.982, RFI=0.951, IFI=0.982, TLI=0.952, CFI=0.982, and their values are all greater than 0.9, indicating that the overall degree of fit between the theoretical model and the observed data is good.

In this structural equation model, the factor score of the financial knowledge level is taken to represent the strength of the financial knowledge level as an independent variable, and the five personality traits such as conscientiousness, extraversion, agreeableness, openness, and neuroticism are used as the moderating variables respectively, to examine whether there are regulatory effects between different personalities on the level of financial knowledge and financial investment. In addition, the individual's gender, age, income, and education level were selected as control variables. The regression results are shown in Table 2.

According to the regression results, it shows that the age, income, and education level as control variables all positively affect financial investment behaviors at a significant level of 1%, while gender negatively affect it at a significant level of 5%, indicating that women's financial investment is slightly more likely than men. There is a negative correlation between the level of financial knowledge as an independent variable and financial investment behavior at a significant level of 5%.

Through this moderating effect model, it can be seen that the non-standardized coefficient of the interaction term of compliance and financial knowledge level is 0.023, and the p-value is 0.025, which shows that under the 5% significance level, the personality characteristic of agreeableness can be significant positively adjusted the relationship between financial knowledge and financial investment behavior, and H3 was accepted. The non-standardized coefficient of the interaction term between openness and financial knowledge level is 0.021, and the p-value is less than 0.01, indicating that the openness of this personality trait can positively adjust the level of financial knowledge and financial investment behavior under a 1% level of significance. For the relationship, H4 was also accepted. Through this model, it can also be seen that the p-values of the interaction terms of conscientiousness, extroversion, and neuroticism and independent variables are all greater than 0.1, indicating that the interactive items of the three personality and financial knowledge levels have no significant effect on financial investment behavior. Therefore, conscientiousness, extraversion, and neuroticism can not significantly moderate the relationship between financial knowledge and financial investment behavior. That is, the hypotheses H1, H2, and H5 were rejected.

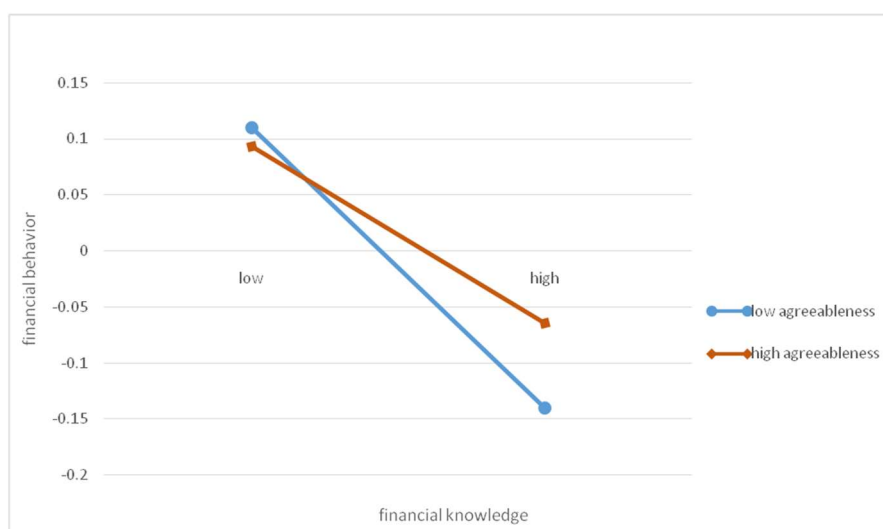


Figure 2. Compliance is the adjusting variable

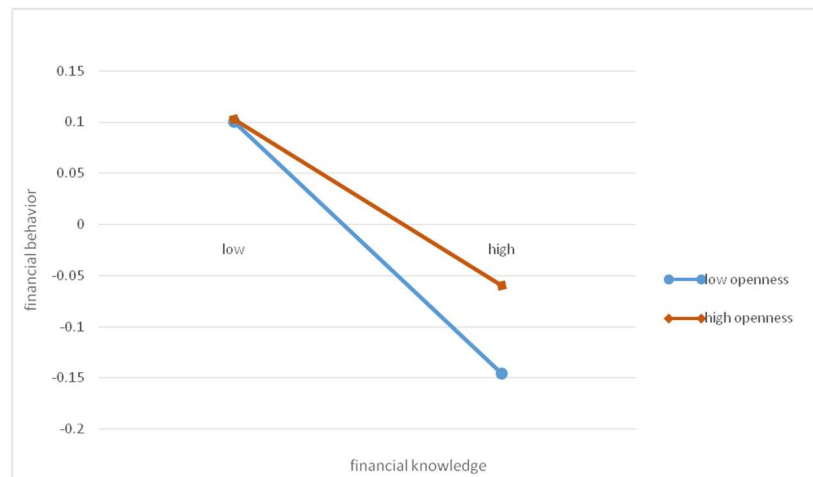


Figure 3. Open is the adjusting variable

A moderate effect plot is drawn for the two moderating variables that have moderate effects. Among them, Figure 2 shows that, compared with low agreeableness, high agreeableness strengthens the negative correlation between financial knowledge and investment behavior. That is, under the same level of financial knowledge, the higher the individual's agreeableness, the less likely they are investing; similarly, the openness in Figure 3 also has a strengthening moderating effect, that is, under a high openness personality, richer financial knowledge will lead to less possible investment. Therefore, agreeableness and openness have enhanced the negative relationship between financial knowledge level and investment behavior to some extent.

5. Conclusion and Suggestion

This paper chooses the 2014 CFPS data, establishes a structural equation model, and conducts empirical analysis on the selected variables to analyze the impact of consumer personality characteristics and financial knowledge level on financial investment behaviors at the micro level. The result shows that consumers with lower levels of financial knowledge are more likely to participate in capital markets and have financial behaviors, whereas consumers with higher levels of financial knowledge are more cautious about participating in financial activities. At the same time, it is also found that the two personality traits of openness and agreeableness have a significant moderating effect on the relationship between financial knowledge and financial behavior in the test of the moderating effects of personality traits. This moderating effect has enhanced the level of negative relationship between financial knowledge and investment behavior to some extent. And it is explained that consumers' different personality traits influence their decision-making effects when they make financial decisions.

Supporters of personality psychology believe that personality traits are relatively stable over a period of time because they are rooted in human neurobiological systems and therefore these characteristics are the only threat to human behavior (Fung and Durand, 2014) [40]. If individuals are aware of their personalities, they can avoid potential biases in financial decisions and explore how they could use their personality traits to plan and manage their personal financial behaviors, thereby enhancing their overall financial quality. Financial consultants and financial institutions can understand the customer's mentality and analyze the customer according to their personality characteristics. They can design the most effective way to popularize financial knowledge and information to customers and propose appropriate trading strategies based on these characteristics, to establish and maintain long-term customers.

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