

Financial Literacy and Risky Investment Decision Making of Millennials in Indonesia Mediated by Information Search

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Abstract: The purpose of the study is to investigate the impact of financial literacy and information search on risky investment decision-making among millennials in Indonesia. Further, this research also examines the effect of information search as a mediating variable on how financial literacy affects risky investment decision-making. This research highlights the positive and significant impact of financial literacy and information search on millennial's risky investment decision-making. The higher the financial literacy level, the tendency to choose risky investment also increases. In addition to that, investors consider the search for information about investment as an important step before making a risky investment decision. Furthermore, the mediating effect of information search is also examined, and the result is still positive and significant, indicating a complementary partial mediation. It suggests that the influence of financial literacy on risky investment decision-making is mediated through information search, while financial literacy itself still explains some of the risky investment decision-making that does not depend on information search.

As implications, it is recommended to conduct a comprehensive financial information assessment for millennials before deciding on risky investment. In addition, financial service providers should optimize on the use of technology in providing company information and performance, as information search is a key parameter for millennials before deciding on risky investment..

Keywords: Financial literacy, information search, risky investment decision-making, millennials

1. Introduction

Millennial or generation Y is a generation born between 1981-2000. With Indonesia's population of 33.75% that represent 88 million people (Deloitte Indonesia, 2019), compared to other demographics such as baby boomers of generation X, this generation is considered as the most technology orienting (Carrasco-Gallego, 2017). In the current era of digital transformation, their skills in using technology are very useful. One of which is to make a number of investment instruments such as share buy, mutual funds, foreign exchange trade and other activities, which can be done via online. However, survey results show contrary results. Technology literacy does not necessarily lead to millennial understanding on the importance of investment.

A research conducted by University of Pennsylvania concluded that to have an adequate pension plan where retirement period begins at the age of 65 years old, the millennial generation is suggested to save up to 40% of their monthly income. However, there is in fact only 1 to 5 people making savings and investment more than 15% of their monthly income (Moreira, 2019). Malaysian Department of Insolvency (MDI) also revealed that between the ages of 18-35 years old, more than 47% of the population are facing serious economic difficulties as a result of excessive lifestyle expenditures, less knowledge in managing investment portfolios, and their investment portfolio diversification (Sabri, 2016).

Meanwhile in Indonesia, millennials only spend 10.3% of their monthly income for their savings and investment. The largest portion is still in the form of savings and the remaining is in the form of investment. Even then, based on the latest research taken by Alvara Center (2020), there are 20% of Indonesian millennials having no financial products at all. Low level of financial literacy and financial products leads to increasingly smaller millennial willingness to invest, but easy access to loan service both online and offline maintains destructive financial habits (Kim et al., 2019).

This study is expected to assist millennial investors to understand the extent of financial literacy and information search in contributing to healthy investment decision making in order to help millennial investors to make thorough evaluation prior to placing any investment. It will also help them to sharpen their financial knowledge and obtain critical information which can prevent them from being overconfident which will contradict rational decision-making behavior.

Financial literacy positively impacts investment decision-making (Sabri, 2016; Mouna & Anis, 2017; Sadiq & Khan, 2018). Lacking financial notion comprehension will accumulate consumers' number of transaction costs, increase debts, and a tendency to be on a high level of debt interest. On the contrary, with good understanding,

they will have a more comprehensive and diverse long-term investment plan (Lusardi & Oggero, 2017). Lack of financial literacy will lead to millennial difficulty to search comprehensive information on financial decision-making (Das, 2016) and will lead to many millennials who make no investment or make unwise investment. Sources of financial information (Mouna & Anis, 2015) are also used as the inputs in decision-making knowing that every investment has its own risks. Uncertainty on the return of investment is attached in any forms of investment products. To reduce risks, investors conduct an information search before ultimately deciding to invest (Gill et al., 2018).

Digital technology eases information search using the internet. Investors can search information on company financial data such as income, long term growth, financial stability, and sales from the internet before deciding to invest. Such information search behavior is called digital information search behavior (Rana et al. 2014). Then Isidore & Christie (2019) proved that digital information search and recommendations from financial experts have positive impacts on risky investment decision-making. Meanwhile, a research conducted by Tseng and Yang (2011) show that recommendations from financial experts have effects on selection of mutual funds, but on the contrary, digital information search has no significant effects on investment intention, especially risky investment.

Previous studies show positive impacts of financial literacy on investment decision-making. Awareness on the importance of financial information will lead to information search which affects their financial literacy (Sharif & Naghavi, 2020). However, empirical studies on how financial information search contributes to mediate financial literacy and investment decision-making are deemed limited. Therefore, this gap will be the focus of this study. This research is expected to be able to answer the following research questions. First, how does financial literacy affect risky investment decision-making for millennials? Second, does financial literacy impact information search behavior on millennials? Third, what impact does information search have in influencing millennials before they decide on risky investment? And the last, how does the information search mediate the relationship of financial literacy on millennials investment decision-making?

Risky Investment Decision Making. Risky decision, defined as alternative characterization encountered by decision makers, is a construct which describes how risky an alternative is compared to other alternatives. A decision is considered to be risky if it involves a high level of uncertainty. In addition to that Muhammad et al. (2018) argued that the risk is the likelihood to be exposed to losses. Moreover, according to Ahmad & Shah (2020), risk perception mediated the impact of risk propensity, individual tendency to make or to prevent risk, on risky decision-making behavior. Therefore, this variable dimension includes risk perception and uncertainty in investment decision-making.

As a cognitive process to select alternatives among other alternative scenarios, individuals cannot make decisions only based on his or her personal knowledge. Framework consumer's purchase decision-making involves a series of steps including identifying a problem, searching for information, evaluating some alternatives, making purchase decisions, and examining post-purchase behavior (Stankevich, 2017). This can also be adapted when investors make investment decisions. When investors make investment decisions, it is necessary to consider the conditions of the market, how tolerant an investor is to risk, and the rate of investment return. Behavioral finance theory describes the responses of different investors to information by not always giving rational behavior or predicting quantitative models in the same and unbiased manner (Abdeldayem, 2016; Shantha et al., 2018). Financial literacy mediates behavioral bias risk on trade returns from investors. This indicates that investors must have financial literacy on a good and broad level to make rational investment decision-making (Ullah et al., 2018).

According to Tunji et al. (2020), economic theory explains terms of decision analysis, which is objective analysis from investors and output prediction, also on subjective perception from investors underlying the decision-making process. Analysis and output prediction can be based on certain factors. Jagongo & Mutswenje (2014) determined that reputation of company, status on industry, income estimation, profits and current financial condition, historical stock performance, price per share, economic conditions and dividend shared to the investors as the most important factors influencing investment decisions of individuals. Digital information search related to company data and aforementioned economic factors can be obtained easily due to internet technology. Meanwhile, subjective perception is particularly affected by risk perception in determining the best alternatives among different investment decisions. Therefore, the way investors subjectively perceive investment risk can be used to predict investment decision actions (Waheed et al., 2020). Subjective knowledge can be described as how individuals feel that they know about something which significantly affects the process and how thorough investors of mutual funds do information search (Fan, 2020).

Financial Literacy. Financially literate is understanding of financial terms, ability, and skills to implement the knowledge such as applying money, inflation, interest rate, credit into personal life by having full awareness of the consequences of any taken financial actions (Stolper & Walter, 2017). In other words, financial knowledge and financial skills are the indexes of formative variables that model financial literacy (Barbic, 2018).

Investors who are financially literate will have financial plans (Henager & Cude, 2016) and investment intention (Sadiq & Khan, 2018) either for short or long term periods; tend to use various financial services (Grohmann, 2017), select a riskier type of investment such as stocks (Aren & Zengin, 2016; Sabri, 2016), thus yielding higher profits (Ahmed et al., 2018).

In the contrary, investors that have a financial literacy on a low level have tend to invest on lower risk investment (Larson et al., 2016), not to invest in stock market (Mouna & Anis, 2017), have problems with loans (Lusardi & Tufano, as cited in Das, 2016), have difficulty to collect wealth and manage property (Stango & Zinman, as cited in Das, 2016), and have no investment plans (Lusardi & Mitchell, as cited in Das, 2016).

An individual making appropriate financial decisions and having financially responsible behavior serves an important role for economic stability and prosperity. Understanding individual financial behavior is important in helping them improve financial decision-making (Van Raaij, 2016) which is one of the three focuses of financial literacy namely financial knowledge, attitude, and behavior (Ameliawati & Setiyani, 2018). The better the financial literacy, the higher the tendency to select risky investment (Aren & Zengin, 2016; Sabri, 2016; Ahmed et al., 2018; Samsuri et al., 2019).

H1: Financial literacy has positive impact on risky investment decision-making

The basic assumptions of market participants that are well-informed, information asymmetry and market failure that make up rational behavior could be described as common aspects utilized by economists and legislators to produce laws that protect both investors and consumers. Therefore, enhancement of information basis for investors is paramount (Buchanan, 2017). According to classical economic theory, well-informed customers (investors) will exhibit financially responsible behavior (Barbic et al., 2018). Subsequently, seeking financial advice or recommendations (Nguyen & Rosza, 2019; Rani & Mann, 2020) from third parties (such as financial advisors or work partners, friends, and family) benefits in aiming individual financial goals e.g. improving wealth, preventing losses, flattening the consumption, and leading financial decision closer to theoretical norms (Sivaramakrishnan et al., 2017).

H2: Financial literacy has positive impact on information search

Information Searches. Today, with the advancement of digital technology, information access to various financial products specifically investment products, from conventional low risk (e.g. savings, deposits, gold) to high risk (e.g. stock, mutual funds, annuity), are wide open. On top of that, the growth of financial technology evolves the way people make payment, decide on investment, and seek financial advice (Lusardi, 2019). Comprehension of certain investment products significantly affects investor behavior, so they tend to invest on those products or assets (Seetharaman et al., 2017). A research conducted by Nguyen and Rozsa (2019) also revealed that despite good levels of financial literacy, individuals still sought for recommendations on his or her retirement investment choice.

Information search is necessary to seek advice from many sources before making the decision to buy investment products to minimize risks (Gill et al., 2018). RISP (Risk Information Seeking and Processing) model combines individual cognitive and socio-psychological factors in responding to any risk threats (freight, anxiety and concerns) by searching and processing information as well as individual perception on the extent of necessary information to overcome the risks. Preceding financial difficulty influenced individual perception on risk characteristics that might lead to financial risk anxiety. Such responses will govern their perception of effective financial knowledge that encourage information search behavior (Sharif & Naghavi, 2020).

Investors seek information, when high uncertainties remain, on investment products to minimize risks on their investment decision. As one of the important tools to be considered in making investment decisions, financial information evaluation will improve overall investment portfolio performance (Akbar et al., 2016). Baxamusa et al. (2014) also revealed that information asymmetry leads to non-profitable investment selection. This can be avoided by conducting a profound evaluation on the company financial reports, hence better decision-making.

Lack of important information or ability to comprehend and apply the information may generate poor financial decisions (Akhtar & Liu, 2018). Therefore, it is imperative to search for information from various sources before making investment decisions to minimize risks. These sources of information can be digital information (Isidore & Christie, 2019) about investment products as well as company financial information and also recommendations or advice from others (Rana et al., 2014; Tseng & Yang, 2011).

H3: Information search has positive impact on risky investment decision-making

Fan (2017) proved that financial advice seeking behavior mediates internal information sources (e.g. financial knowledge as human capital factor) and financial management behavior. Financial knowledge is known as an important component in financial literacy (Ameliawati & Setiyani, 2018). In addition, investment advice given by financial experts could explain the effect of financial literacy of an individual’s financial management (Topa et al., 2018). Therefore, information search can be concluded as a mediator on how financial literacy affects financial management behavior, also called investment decision-making behavior in this research.

H2a: *Information search mediates the relationship between financial literacy and risky investment decision-making*

Based on the above hypotheses, to answer research questions, the research model is developed as follows:

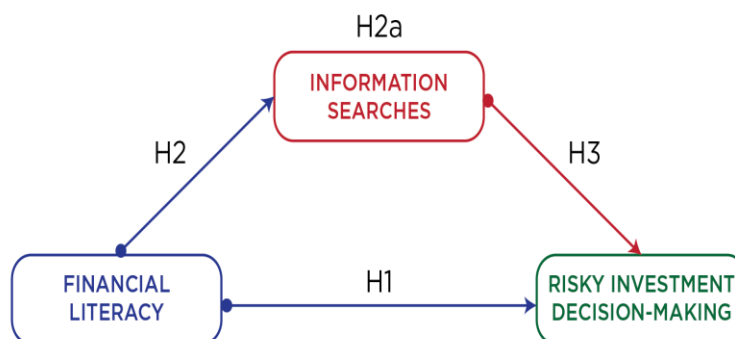


Figure 1 Research Model

2. Methods

Quantitative research conducted using survey design aims to answer the research questions. Survey research can be understood as a way to collect information from an object of study which includes collecting information from a population at a certain time (Sileyew, 2019). Mugenda & Mugenda (1999) as cited by Jangongo & Mutswenje (2014) noted that survey research is conducted to collect data from a population which data will then be used to describe the occurring and present phenomena by questioning for individual opinions, attitudes, behaviors, or values. The unit of analysis of this study will be individual investors.

Measurement Instruments. A psychometric scale was developed from the literature to measure both direct and indirect effects between financial literacy and risky investment decision-making with information search as the mediating variable. The examination will be split into two sections. The first section covers general information and respondent’s demographics such as age, gender, education, and income level. The second section includes questions about research variables i.e. 10 questions to measure the behavior of risky investment decision-making (RIDM), adapted from Gill et al. (2018) and Larson et al. (2016); To assess the effect of financial literacy (FINLIT), 6 questions adapted from Larson et al. (2016); and 7 questions to investigate the effect of information search (INFO) by investors, adapted from Gill et al. (2018). Respondents will respond to the given questionnaire questions using a five-point Likert scale, where 1 indicates "strongly disagree" and 5 indicates "strongly agree".

Data collection. We collect the primary data that is obtained through an internet-based survey for a predetermined period of time which was distributed among millennial individual investors through social media. The total sample of the study are millennials (aged > 20 years and < 39 years), having their own income and are domiciled in Indonesia; is 347 respondents. The demographics of millennial respondents can be found below on Table 1.

Table 1 Demographics of Millennial Respondents

Demography	Total	Percentage
Gender		
Male	170	49%
Female	177	51%
Age		
20 - 29 years old	191	55%
30 - 39 years old	156	45%
Level of education		
Under Senior high	2	1%
Senior High	96	28%

Diploma (D1 – D3)	26	7%
Bachelor (D4 – S1)	177	51%
Postgraduate and above	46	13%
Monthly income		
Less than IDR 5 million	147	43%
IDR 5 - 10 million	126	36%
IDR 10 - 20 million	37	11%
IDR 20 - 30 million	22	6%
More than IDR 30 million	15	4%
Domicile		
Jabodetabek	190	55%
Bandung	45	13%
Serang	32	9%
Balikpapan	29	8%
Others	51	15%

Data Analysis. Structural Equation Modeling (SEM) was carried out using the SmartPLS to investigate the relationship according to the hypothesis presented in the research model. Before testing the significance of the relationship between variables, construct validity and reliability were tested with the value of loading factors (item-to-construct loadings), Average Variance Extracted (AVE) as a convergent validity criterion (Hossan et al., 2020), Composite Reliability (CR), and the discriminant validity of the measurement measures (Henseler et al., 2009).

Table 2 Composite Reliability and Average Variance Extracted, N = 347

Construct	Number of Item	AVE
Risky Investment Decision Making (RIDM)	5	0.847
Financial Literacy (FINLIT)	6	0.881
Information Searches (INFO)	6	0.897

Table 3 Discriminant Validity: Fornell & Larcker Criterion (N = 347)

Construct	RIDM	FINLIT	INFO
Risky Investment Decision Making (RIDM)	0.726		
Financial Literacy (FINLIT)	0.575	0.746	
Information Searches (INFO)	0.407	0.376	0.771

A factor loading of 0.5 or more is generally used for practical significance (Hair et al., 2014, p. 116). While an AVE value of 0.5 or more is sufficient to indicate convergent validity, means that on average more than 50% variance of the indicator can be explained by the latent variable. Whereas CR to indicate items variability must be greater than 0.7 (Chin, 1998). After evaluating the measurement model through validity, reliability, and discriminant validity tests; the next step is to test the hypothesis by bootstrapping. The beta coefficient (β) in standard regression was interpreted as the structural coefficient among the exogenous variables. According to Henseler et al (2009), there are two criteria that must be met for the hypothesis to be accepted, namely conformity with theoretical predictions and also statistical significance.

3. Result And Discussion

As mentioned earlier, a factor loading of 0.5 or more is used for practical significance. In this study the INFO3 and RIDM1 items had a factor loading value < 0.5 , so they were excluded from the analysis. However, by removing these two items, the AVE value for the RIDM variable = 0.381 (< 0.5), hence the next step is removing

the item with the lowest factor loading until the AVE value increases to > 0.5. By removing items INFO3, RIDM1, RIDM2, RIDM4, RIDM6, RIDM7 from the analysis, the AVE value of the RIDM indicator increases to 0.527 (Table 2). All items used in data analysis are presented in the Appendix. Table 2 shows that CR and AVE values of each construct meet the specified criteria (CR > 0.7, AVE > 0.5). Therefore, this model fulfills the construct reliability and convergent validity. The AVEs' square roots are shown on the diagonal of Table 3. The discriminant validity is proven because the AVEs' square roots for each variable are greater than their square correlation with other variables in the model.

Evaluation of the link between financial literacy (FINLIT), information search (INFO), and risky investment decision-making (RIDM) is conducted to determine whether the hypothesis can be accepted or rejected. Financial literacy and risky investment decision-making relationship is significant at 0.491 ($p < 0.05$), indicating that a variation of one standard deviation in financial literacy will lead to variation in risky investment decision-making of 0.491 standard deviation. The higher financial literacy levels will show positive effects of financial literacy, then investors will select risky investment decision-making (Hypothesis 1 is supported). This is consistent with Aren and Zengin (2016), Sabri (2016), Ahmed et al. (2018) and Samsuri et al. (2019) that concluded the higher the financial literacy level, the tendency to choose risky investment also increases.

The relationship between financial literacy and information search is also significant at 0.376 ($p < 0.05$), indicating that when financial literacy increased by one standard deviation, information search increased by 0.376 standard deviation. Therefore, if the financial literacy levels are higher, the more it will encourage information search behavior about investment, both digital information and advice from other parties (Hypothesis 2 is supported).

Lastly, information search and risky investment decision-making have a positive and significant impact at 0.222 ($p < 0.05$). In other words, change in information search by one standard deviation will result in 0.222 standard deviation change in risky investment decision-making. This indicates that investors consider the search for information about investment as an important step before making a risky investment decision (Hypothesis 3 is supported). In accordance with past examinations that the lack of important information will encourage bad decision-making (Akhtar & Liu, 2018). As consequences, it is necessary to seek information from various sources before making investment decisions (Rana et al., 2014; Tseng & Yang, 2011) to minimize risk (Gill et al., 2018).

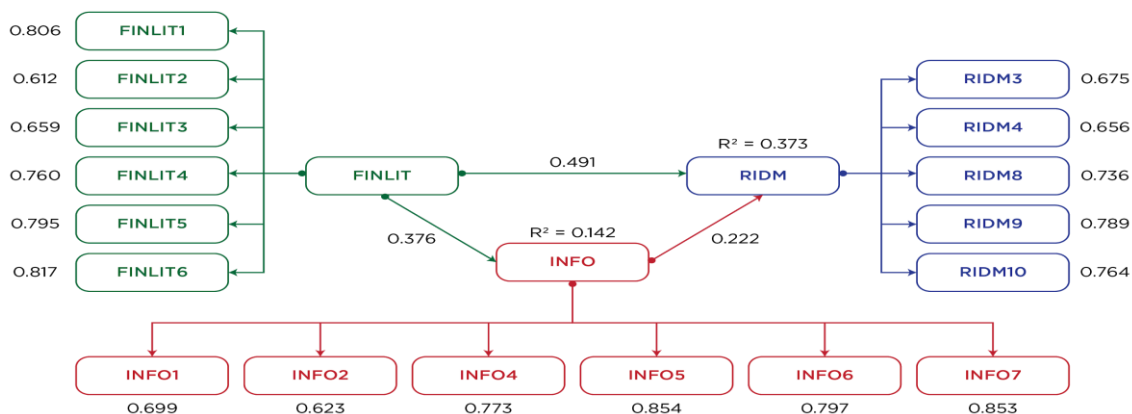


Figure 2 Structural Model

Table 4 Hypothesis Testing

Hypothesis	Structural Coefficients (p-value)	Std Error	T Statistics	Judgement
H1: FINLIT → RIDM	0.491 (0.000)	0.043	11.295	Supported
H2: FINLIT → INFO	0.376 (0.000)	0.053	7.117	Supported
H3: INFO → RIDM	0.222 (0.000)	0.044	5.006	Supported

The three hypotheses are proven to be empirically significant. Hence, the mediating result of information search on financial literacy and risky investment decision-making for millennials reveals a complementary partial mediation. A complementary partial mediation can be concluded if the direct effect of financial literacy on risky investment decision-making and indirect effects (FINLIT to INFO) x (INFO to RIDM)] indicate the same positive values (Baron & Kenny, 1986; Zhao et al, 2010 cited from Nitzl et al, 2016). It means the influence of financial literacy on risky investment decision-making is mediated through information search, while financial literacy itself still explains some of the risky investment decision-making that does not depend on information search.

Table 5 Mediating Effects

Hypothesis 2a	Structural Coefficients (p-value)	Std Error	T Statistics	Judgements
Total Effect:				
FINLIT → RIDM (c')	0.575 (0.000)	0.036	16.160	Significant
Total Indirect Effect				
(a x b): FINLIT → INFO (a) → RIDM (b)	0.084 (0.000)	0.021	3.944	Significant

In complementary partial mediation, the portion of the mediation or how strong the mediation affects in a model can be determined by calculating the ratio of the indirect effect (a x b) to the total effect (c = a x b + c') or the VAF (Variance Accounted For). In case the absolute value of total effect is at least 0.2 as suggested by Hair et al., 2016 then the VAF calculations can be performed. From Table 5, the total effect is 0.575. Thus, the VAF value is 14.5%, meaning that 14.5% of the mediation process can explain the variance of risky investment decision-making or almost no mediation that occurs because the value is < 20% (Hair et al., 2016). The low VAF value although statistically significant indicates that information search is a spurious (false) variable that might falsify financial literacy (FINLIT) and risky investment decision-making (RIDM) relationship according to Zhao et al. as cited by Nitzl et al (2016) that positive confounding or consistent models are often used to refer to complementary partial mediation.

Based on the R2 value, it can be seen that 14.2% of the variance in information search indicates that although financial literacy is a significant predictor of information search, most of the variations in information search remain unexplained in this model (Figure 2). This may mean that investors, regardless of their financial knowledge, will search for information before deciding to invest to minimize risk. (Gill et al., 2018; Sharif & Naghavi, 2020). On the other hand, 37.3% of the variation in risky investment decision-making can be explained by financial literacy and information search. This confirms that financial literacy and information search are significant predictors of risky investment decision-making.

4. Conclusion

This study aims to evaluate whether financial literacy and information search will affect risky investment decisions among Indonesian millennials. In addition, this research also aims to investigate whether information search can mediate the relationship between financial literacy and risky investment decision-making. This study confirms positive effects between financial literacy and information search on risky investment decision-making among millennials. As well, financial literacy and millennial’s risky investment decision-making relationship is mediated by information search.

The findings of this study provide implications for millennial investors in particular to carry out a comprehensive evaluation of the knowledge and financial information they obtain towards rational risky investment decision-making. More broadly, this research has implications for financial service providers, especially investment products, to increase the use of the Internet and technology (i.e., websites, applications, social media). It is a tool to convey information about investment products and company performance before investors make an investment decision by searching for related information.

One example would be people with moderate to high financial literacy but lacking in complete information search are prone to be misguided by investment options that seem legit but actually fraudulent since without

thoroughly examining the outcomes of the investment options, it will be hard to spot problematic possibilities especially if the fraudulent investment options have a good media representation or social media engagement.

For further research, it is expected to examine the determinants that influence information-search behavior with a model that adapts perceived benefits of searching information, such as the need to justify decisions, and the desire to reach the optimal decision (desire for optimal decision). In this case, not only the perceived search information can be seen, but also the education level and subjective/objective knowledge (Stankevich, 2017) or financial knowledge can be affected. Apart from that, testing other mediating variables can also be done, considering that investors are not always rational in making risky investment decisions. This can be affected by different emotional factors, attitudes, and biases.

Appendix

Construct & Measure	Std Loading	Composite Reliability	AVE
Risky Investment Decision Making (RIDM) RIDM3 – I feel comfortable improving in new situations (Larson et al., 2016) RIDM5 - I would like to realize the gain as soon as the stock increases in price (Gill et al., 2018) RIDM8 – I am willing to risk financial losses (Larson et al., 2016) RIDM9 - I prefer investments that have higher returns even though they are riskier (Larson et al., 2016) RIDM10 - I am very willing to make risky investments to ensure financial stability in retirement (Larson et al., 2016)	0.675 0.656 0.736 0.789 0.764	0.847	0.527
Financial Literacy (FINLIT) (Larson et al., 2016) FINLIT1 - I know pretty much about Finance FINLIT2 - I do not feel very knowledgeable about Finance FINLIT3 - Among my circle of friends, I'm one of the "experts" on Finance FINLIT4 - Compared to most other people, I know less about Finance FINLIT5 - When I have a need for financial services, I am familiar with where to obtain information on what to do FINLIT6 - I am more familiar than most people about financial investments	0.806 0.612 0.659 0.760 0.795 0.817	0.881	0.556

<p>Information Searches (INFO) (Gill et al., 2018) INFO1 - I like to discuss financial options before making a decision about them INFO2 - I would need advice on investment options from professional financial advisors in making financial decision INFO4 - I would like to search for information from magazines and brochures from financial institutions to help making financial decision INFO5 - I would like to search for information about a firm's expected earnings before investing in a firm INFO6 - I would like to search for information about firm's financial statements before investing there INFO7 - I would like to search for information about firm status in industry before investing there.</p>	<p>0.699 0.623 0.773 0.854 0.797 0.853</p>	<p>0.897</p>	<p>0.595</p>
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