

The Relation between adolescents' Basic Needs Satisfaction and Financial Literacy

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Abstract

This study examines the impact of Basic Needs Satisfaction—autonomy, competence, and relatedness—on financial literacy among high school students in Korea. Autonomy motivation refers to the degree of self-directed choice in learning, competence motivation pertains to the perceived mastery and efficacy, and relatedness motivation involves the sense of belonging and connection with others. The study employed a randomized controlled trial with 191 first-year high school students, analyzing the effects of both face-to-face and remote financial education. The results indicate that autonomy motivation significantly enhances financial literacy, whereas competence and relatedness motivations do not exhibit a significant effect. Additionally, financial education was more effective for students with lower baseline financial literacy levels, suggesting the need for tailored educational interventions. Gender did not significantly influence financial literacy outcomes. These findings highlight the importance of fostering autonomy in financial education to enhance financial literacy, with implications for designing educational strategies that address varying levels of pre-existing knowledge. Future research could explore cultural factors and the role of socio-economic status in shaping financial literacy and motivation.

Keyword : Financial literacy, Financial education, Self-determination theory, Autonomy, Competence, Relatedness, Adolescents

1. Introduction

1.1 Background and Purpose

In an era of rapidly evolving global economic dynamics, economic forecasting faces escalating uncertainty. As the financial landscape grows increasingly intricate, understanding these phenomena becomes essential for effectively navigating the future. The UN World Economic Outlook Report for 2024 highlights a rising likelihood of prolonged low-growth scenarios, particularly in advanced economies [1], and growing concerns about faltering growth in many vulnerable, low-income emerging economies. Economic crises exacerbate national debt burdens, often due to irresponsible financial practices and

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inadequate financial literacy, affecting both adults and youth [2]. Since the global financial crisis, major economies have increasingly emphasized financial education within consumer financial protection policies [3].

Atkinson and Messy [4] conducted international research under the OECD's International Network on Financial Education (INFE), finding a correlation between low income and deficient financial literacy, which may hinder financial capabilities. The OECD/INFE Financial Literacy Survey across 17 European countries in 2015 indicated a dearth of adequate financial literacy knowledge among the majority of high school students in Europe. Consequently, financial literacy, increasingly acknowledged as imperative, becomes an integral component of education [5]. Jayaraman and Jambunathan [6] assessed financial literacy among high school students in India, discovering lower scores compared to their counterparts in advanced nations. A survey on 'financial literacy' by the Bank of Korea and the Financial Supervisory Service in 2022 [7] revealed that individuals in their twenties fell short of the minimum level set by the Organization for Economic Cooperation and Development (OECD). Korean youth face marginalization due to fierce competition in college entrance exams, where economics is not compulsory, resulting in persistently low levels of financial literacy.

In 2000, OECD/INFE devised the Financial Literacy Index, and numerous countries and institutions have since been gauging financial literacy. Numerous studies consistently demonstrate disappointing financial literacy test scores among the majority of young people, even those who have undergone personal finance or money management courses [8-11]. Given that financial attitudes and behaviors are often shaped during developmental years, financial education during adolescence assumes paramount importance in fostering lifelong financial decision-making skills, necessitating the measurement and assessment of financial literacy levels during this developmental stage [12][13]. Financial education aims not only to impart financial knowledge but also to instill sound financial behaviors and attitudes based on that knowledge [14]. Consequently, financial education is globally acknowledged as an indispensable facet of survival education. For instance, Seok [15] noted that adolescents lacking proper financial education since childhood are more susceptible to falling victim to financial crimes. Hence, financial literacy is widely recognized as crucial, and comprehending the factors influencing it can inform strategies for long-term financial well-being and stability.

Furthermore, motivation plays a pivotal role in various fields of learning, including distance learning, consumer studies, medical education, and physical education [16][17]. To the best of our knowledge, few studies have explored the role of motivation in financial literacy. Consequently, this study aims to scrutinize the extent to which motivation influences the financial literacy of adolescents, employing the

lens of self-determination theory [18].

Self-determination constitutes a fundamental aspect of motivation theory. Ryan and Deci [18] introduced the theory of self-determination, positing that internally driven choices hold greater efficacy than externally motivated ones. Self-determination encompasses autonomy, competence, and relatedness, with their confluence maximizing motivation. Essentially, self-determination denotes the extent to which motivation for a task emanates from one's own volition. Bondie and Zusho [19] assert that ABC+M aids in discovering motivation by incorporating 'Meaning' in addition to autonomy, belonging, and competence. Autonomy pertains to perceiving choice and willingly endorsing one's behavior, encompassing self-choice and decision-making. Recognizing adolescents as autonomous agents capable of making self-directed choices and decisions necessitates reflecting this in educational practices. Activities that engage youths in decision-making and actions on issues they care about empower them to take action [20]. Moreover, groups with high autonomous motivation exhibit greater levels of self-regulated learning than those with high heteronomous motivation [21]. Relatedness entails feeling connected and experiencing a sense of belongingness with others. Those who feel greater belonging and meaning in the company of others exhibit differing motivations from those who do not [19]. Lastly, competence entails mastery and efficacy in one's endeavors. The theory of self-determination posits that perceived competence is pivotal for students' academic achievement.

To date, to the best of our knowledge, no study has examined how basic needs satisfaction relates to enhancing financial literacy through financial education. Consequently, this study seeks to explore the interplay between basic needs satisfaction and financial literacy, offering insights and policy recommendations and delineating various educational methods accordingly.

2. Research Methodology and Process

2.1 Research questions

As of the end of 2023, the South Korean economy ranks 13th among OECD countries [22], positioning it as one of the economically affluent nations. However, it is juxtaposed with the looming demographic challenges of declining birth rates and an aging population, forecasting economic challenges such as low growth and high inflation. There emerges a critical need to empower younger generation with the tools necessary for sustaining economic vitality. This study, therefore, seek to address this imperative by evaluating the impact of financial education, utilizing self-determination theory.

To examine the relations between basic needs satisfaction and financial literacy through this study, three research questions will be addressed as follows.

To what extent do the elements of basic needs satisfaction affect financial literacy among adolescents?

To what extent does financial education influence financial literacy?

Does the impact of financial education differ based on initial financial literacy levels?

To what extent does gender affect financial literacy?

2.2 Method and Procedure

The financial education provided in this study consisted of both face-to-face and remote learning modalities. Face-to-face financial education sessions were conducted during the school's experiential education week, with recruitment efforts targeted at the high school level. Each session lasted for 100 minutes, and the curriculum was delivered by the Youth Financial Education Council in South Korea. The educational approach employed participatory methods, including interactive games within the lectures. The content covered in the financial education encompassed topics such as consumption and credit, banking and savings, as well as securities companies and investments.

In addition to the face-to-face sessions, remote learning components were incorporated. Four sessions of online financial education were selected from educational materials developed by the Financial Supervisory Service. Links to these video clips were distributed to students who voluntarily opted for remote learning via their mobile phones. Upon watching the video clips, participants were required to complete quizzes to verify their engagement. The remote learning content focused on various aspects of investment finance, including the introduction of financial investment products, investment strategies, and rates of return. Each online session lasted approximately 5-10 minutes.

2.3 Participants

This study utilized data from the Outcome Study of a Youth Program for Self-Directed Learning (OSYP), a community-based experimental study conducted in 2022. OSYP was initiated by Uijeongbu city, Korea, in response to the educational disparities resulting from the COVID-19 pandemic. The ethics approval for the analysis protocol of the present study was waived by the institutional review board of Shinhan University, because the raw data does not include any identifying information. Employing a convenient cluster sampling design, OSYP targeted first-year high school students in Uijeongbu city,

resulting in the selection of two schools as the final clusters. Students from these selected schools were invited to participate in the study, yielding a final sample size of 305 students. The study employed a randomized controlled trial, with schools randomly assigned to either the experimental or control group. The experimental intervention comprised 100 minutes of in-class education and four sessions of online financial education. Data were collected from students at multiple time points, including pre-tests administered to both groups. For the experimental group, in-class education was immediately followed by online education over the course of a week, culminating in post-tests and follow-up assessments. In contrast, the control group received education after both pre- and post-tests, followed by a subsequent follow-up assessment.

The primary focus of our study was to assess changes in financial literacy before and after financial education, necessitating the following inclusion criteria: students who completed both pre- and post-tests. This resulted in a final sample size of 191 students, with 84 students in the experimental group and 107 students in the control group. These high school freshmen had an average age of 15.78 years ($SD=.65$) and comprised 50.25 % girls ($N= 99$) and 49.75 % boys ($N= 92$).

2.4 Measures

Financial literacy. The measurement tool for financial literacy consisted of questions for each area utilized by the Financial Supervisory Service (FSS) in 2004. It was based on the questionnaire developed by Jump\$Start, an American youth economic education organization. The FSS adapted the questionnaire to fit Korea's financial environment and the perspectives of students. With the assistance of experts, questions from the FSS questionnaire that were deemed excessively difficult or inappropriate for Korea's current situation were eliminated and reorganized, resulting in 18 questions for this study. These questions were organized into four categories: understanding income (4 questions), understanding money management (4 questions), understanding savings and investments (5 questions), and understanding spending and credit (5 questions). The score was then converted to a scale ranging from 0 to 100 based on the number of correctly answered questions. Subsequently, for the purposes of the present study, financial literacy was defined as a dichotomous variable, with scores categorized as either 0 for low financial literacy or 1 for high financial literacy, using the mean score of financial literacy as the cutoff point.

Basic needs satisfaction. We utilized the Basic Psychological Needs (BPN) scale, grounded in the self-determination theory of motivation, to evaluate adolescents' self-determination motivation driven by fulfilled psychological needs. Ryan and Deci's basic psychological needs scale was validated for Korean

adolescents by Lee and Kim [23]. Lee and Kim evidenced its criterion validity using students' academic self-regulation scale scores, academic self-efficacy scale scores, school adjustment scale scores for autonomy, competence, and relatedness, respectively. They reported a good internal consistency reliability, .70 for autonomy, .75 for competence, and .79 for relatedness. The 18-item BPN scale comprises three subscales: Autonomy, Competence, and Relatedness. Students employed a 5-point scale (1 = rarely true, 2 = usually not true, 3 = in between, 4 = usually true, 5 = almost true) to assess the extent to which they felt fulfilled with the basic psychological needs across the three domains. Examples include "There is not much opportunity for me to decide for myself how to do things in my daily life" (Autonomy), "I often feel very efficient" (Competence), and "I get along with people I come into contact with" (Relatedness). Reverse coding was applied if necessary, and subscale scores were calculated by averaging all items of each subscale. Higher scores indicate greater levels of need fulfillment. The BPN exhibited good internal consistency in Lee and Kim's study [23]: .70 (Autonomy), .75 (Competence), and .79 (Relatedness), and demonstrated evidence for criterion validity regarding school adjustment. In this study, before running an exploratory factor analysis, we checked suitability of our data with the Kaiser-Meyer-Olkin (KMO) statistic and Bartlett's test of sphericity. The KMO value was .89, and Bartlett's test of sphericity was significant at .001 level. Therefore, we were confident about sample adequacy. A principal axis factor analysis with direct oblimin rotation yielded the same three factors, which accounted for 63.9 % of the variance. Each factor was comprised of 6 items. Factor 1 (Autonomy) explained 6.7 % of the variance with factor loadings from .317 to .814. Factor 2 (Competence) explained 48.4 % of the variance with factor loadings from .414 to .852. Factor 3 (Relatedness) explained 8.9 % of the variance with factor loadings from .631 to .839. Chronbach's α revealed a good internal consistency reliability (.87, .86, and .90, respectively). For the purposes of this study, each subscale of the basic needs satisfaction was delineated as a dichotomous variable, with a code of 0 indicating low fulfillment and 1 indicating high fulfillment. Average scores below 4 points were coded as 0, while scores of 4 points or higher were coded as 1.

Demographic form. Students provided information regarding their gender and age.

3. Data Analysis

3.1 Preliminary Analysis

This study utilized SPSS 25.0 for data analysis. Initially, principal axis factor analyses were conducted to assess the factorial validity of the scale measuring self-determination motivation, followed by a

reliability test.

Before proceeding with our primary analysis, to evaluate a potential threat to internal validity, we examined whether individuals who completed both pre- and post-tests differed from those who dropped out after the pre-test. Among the 224 students who participated in the pre-test, thirty-three students (14.7 %) dropped out. The dropouts did not exhibit significant differences from those who remained for the post-test in terms of gender, $\chi^2(1, N= 224) = .13, p= .722$. Additionally, they did not differ in the pre-test scores for all the study variables: financial literacy, $t(222) = 1.05, p= .293$; autonomy motivation, $t(222) = .75, p= .456$; competence motivation, $t(222) = 1.03, p= .304$; and relatedness motivation, $t(222) = 1.18, p= .239$.

Subsequently, we assessed whether the experimental and control groups were comparable. The results indicated no significant differences in the pre-test scores for all the study variables: financial literacy, $t(189) = .37, p= .715$; self-directed learning ability, $t(189) = 1.08, p= .284$; autonomy motivation, $t(189) = .64, p= .520$; competence motivation, $t(189) = .15, p= .878$; and relatedness motivation, $t(189) = .43, p= .667$.

3.2 Primary Analysis

To assess the extent to which gender, financial education, self-directed learning ability, and basic needs satisfaction influence financial literacy, we conducted a factorial analysis of variance (ANOVA). The effect size of each independent variable was examined using partial eta squared (η^2) and Cohen's *d*. According to Cohen [24], an η^2 value of .01 indicates a small effect size, .06 indicates a medium effect size, and .14 indicates a large effect size. For Cohen's *d*, a value of |.20| indicates a small effect size, |.50| indicates a medium effect size, and |.80| indicates a large effect size.

We assessed the assumptions for factorial ANOVA. The assumption of normal distributions of the dependent variable for each group was met, with skewness ranging between .24 and .78. The values between -1 and +1 are considered acceptable in order to prove normal univariate distribution [25]. Levene's test confirmed the assumption of homogeneity of variances was met, $F(46, 144) = .96, p= .551$. The samples were taken independently, so there is no indication that independence assumption is violated.

4. Results

Research question 1. To what extent do the elements of basic needs satisfaction affect financial

literacy among adolescents?

Descriptive statistics for the post-test scores of financial literacy are presented in [Table 1]. [Table 2] demonstrates that autonomy motivation had a significant main effect on the post-test scores of financial literacy, $F(1, 183) = 10.86$, $p = .001$, partial $\eta^2 = .06$, indicating that a high level of autonomy motivation was associated with higher post-test scores of financial literacy. According to Cohen [24], this effect size is considered medium. Conversely, the other two elements of basic needs satisfaction (i.e., competence motivation and relatedness motivation) had no effect on the post-test scores of financial literacy.

[Table 1] Descriptive Statistics for Post-test Scores of Financial Literacy by Independent Variables (N=191)

Variable		N	%	Post-test scores of financial literacy (M= 40.69, SD= 14.85)	
				M	SD
Gender	Male	92	48.17	40.25	15.28
	Female	99	81.83	41.11	14.49
Pre-test financial literacy	Low	106	55.55	38.36	15.21
	High	85	44.45	43.59	13.94
Financial Education	Experimental	84	44.00	43.65	14.24
	Control	107	56.00	38.37	14.96
Basic needs satisfaction					
Autonomy motivation	Low	112	58.64	38.93	12.06
	High	79	41.36	46.03	16.76
Competence motivation	Low	137	71.73	39.66	14.18
	High	54	28.27	43.31	16.26
Relatedness motivation	Low	84	44.00	37.76	14.16
	High	107	56.00	42.99	15.03

Research question 2. To what extent does financial education influence financial literacy?

[Table 2] illustrates that financial education had a significant main effect on post-test scores of financial literacy, $F(1, 183) = 4.11$, $p = .044$, partial $\eta^2 = .02$. However, it should be noted that there was a significant interaction between the effects of pre-test scores of financial literacy and financial education, which alters the interpretation of the separate main effect of financial education. This interaction is addressed below.

[Table 2] Analysis of Variance for Post-test Financial Literacy as a Function of Gender, Pre-test Financial Literacy, Financial Education, **Basic Needs Satisfaction**, and Self-Directed Learning Ability

Variable ^a and sources	df	MS	F	P	Partial η^2
Gender ^b	1	195.67	1.03	.311	.01
Pre-test financial literacy	1	649.04	3.42	.066	.02
Financial education ^c	1	778.82	4.11*	.044	.02
Basic Needs Satisfaction					
Autonomy motivation	1	2058.63	10.86**	.001	.06
Competence motivation	1	19.25	.10	.750	< .01
Relatedness motivation	1	154.19	.81	.368	< .01
Pre-test financ literacy*financ educ	1	1143.48	6.03*	.015	.03
Error	183	190.55			

Note. $R^2 = .172$ ($Adj-R^2 = .140$). * $p < .05$. ** $p < .01$. ^a dichotomous variables coded as low level=0, high level = 1. ^b female = 0, male = 1. ^c controlgroup = 0, experimental group = 1.

Research question 3. Does the impact of financial education differ based on initial financial literacy levels?

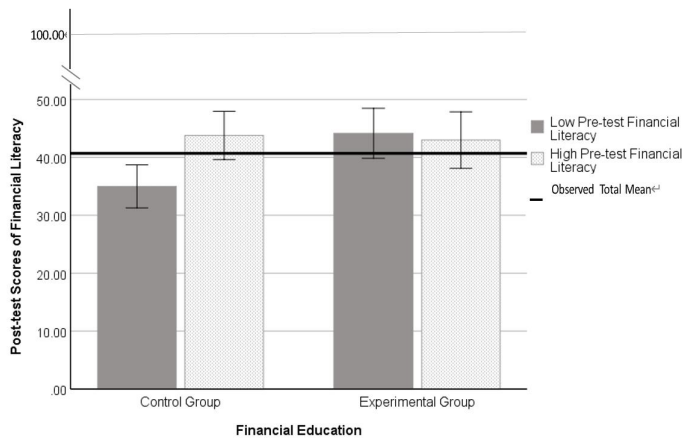
[Table 3] demonstrates a significant two-way interaction between the effects of pre-test scores of financial literacy and financial education, $F(1, 182) = 5.96$, $p = .016$, partial $\eta^2 = .03$. [Fig. 1] illustrates this interaction. Post hoc analysis revealed that regarding the group with low scores on the pre-test of financial literacy, the experimental group ($M = 43.84$, $SD = 15.09$) had higher post-test scores of financial literacy than the control group ($M = 34.17$, $SD = 14.02$), $t(104) = 3.41$, $p = .001$, $d = .66$, indicating that financial education had a significant effect on post-test scores of financial literacy for those who had a low level of baseline financial literacy. This effect size is considered between medium and large according to Cohen [24]. In contrast, regarding the group with high scores on the pre-test of financial literacy, the experimental group did not differ from the control group in terms of the post-test scores of financial literacy, indicating that financial education had no effect on post-test scores of financial literacy for those who had a high level of baseline financial literacy. [Table 3] presents the descriptive statistics of post-test scores of financial literacy by financial education and pre-test scores of financial literacy.

[Table 3] Descriptive Statistics of post-test scores of financial literacy by financial education and pre-test scores of financial literacy

	Low pre-test scores of financial literacy			High pre-test scores of financial literacy			Total		
	N	M	SD	N	M	SD	N	M	SD
Financial education									
Experimental	46	43.84	15.09	38	43.42	13.34	84	43.65	14.24
Control	60	34.17	14.02	47	43.74	14.54	107	38.37	14.96
Total	106	38.36	15.21	85	43.59	13.94	191	40.69	14.85

Research question 4. To what extent does gender affect financial literacy?

As shown in [Table 2], gender had no effect on post-test scores of financial literacy.



[Fig. 1] Interaction of the Effects of Pre-test Scores of Financial Literacy and Financial Education

5. Conclusion and Discussion

The findings illuminate the complex interplay between motivation, financial education, and financial literacy among high school students, offering valuable insights for policymakers and educators striving to enhance financial literacy among adolescents. One key finding of this study is the significant association between autonomy motivation and financial literacy scores. Students exhibiting high levels of autonomy motivation demonstrated greater proficiency in financial literacy. This underscores the importance of empowering students to make self-directed choices and decisions in their learning, aligning with prior

research [16][17][26]. Employing self-determination theory, Reeve mentioned autonomy-supportive teaching involves considering the learners' perspective, providing meaningful choices, informative feedback, optimally challenging learning activities, meaningful rationales, and genuine care for them [27]. These suggest that financial education incorporating elements that foster autonomy can enhance students' financial literacy.

While autonomy motivation emerged as a significant predictor, contrary to expectations, competence motivation and relatedness motivation did not demonstrate a significant impact on scores of financial literacy. These findings were inconsistent with studies showing that perceived competence predicted academic achievement among biology students in higher education settings [28][29] and studies implicating the positive effect of competence and relatedness motivation on self-regulated learning strategies in distance learning environments in higher education during COVID-19 [17]. This discrepancy with previous studies may be attributed to methodological differences. Previous studies reviewed above used students in higher education in European countries, and the outcome measures varied across studies. Future studies are needed to determine whether elements of self-determination motivation function differently across cultures in predicting financial literacy.

This study also investigated the effectiveness of financial education in improving financial literacy among high school students. Extending beyond previous studies on the effectiveness of financial education [3], the interaction between pre-test scores of financial literacy and financial education revealed differential effects of financial education based on students' baseline financial literacy levels. Specifically, financial education benefited students with low baseline scores but not those with high baseline scores. This suggests that interventions tailored to students' initial levels of financial literacy are more effective, highlighting the need for educational strategies that accommodate the diverse learning needs of students.

Interestingly, the study found no significant effect of gender on scores of financial literacy, indicating that gender did not influence students' financial literacy outcomes. Previous studies yielded inconsistent results. For example, Becchetti et al. observed that girls exhibited lower levels of financial knowledge; however, financial education reduced the gender gap [30]. In contrast, Mandell and Klein found that girls outperformed boys in the pre-test and exhibited greater learning gains from the intervention compared to males [31]. Varcoe et al. found that boys showed a significant increase in financial knowledge following the financial education program [32]. Amagir et al. suggested that these discrepancies across studies may be due to cultural differences. Future meta-analytical studies with culture as a moderator could provide further insights into the effect of gender [3].

Finally, this study has some limitations. Findings may not be generalized to the population of high school students in the Republic of Korea because we recruited participants through a non-probability sampling method, convenience sampling. However, our employing an experimental design would reduce convenience sampling bias. Future study replicating this study would ensure its external validity by increasing the diversity of participants. The literature suggests that family socio-economic status is associated with students' financial literacy [33][34]. However, this study could not include variables of family socio-economic status because the data did not provide information on it. To enhance the robustness and comprehensiveness of future studies, it is recommended that researchers include a broader array of variables, such as family socio-economic status, parental education levels, and access to financial resources, to better capture the multifaceted nature of financial literacy. Furthermore, cross-cultural comparisons could yield valuable insights into how different educational contexts and cultural norms impact the relationship between motivation and financial literacy [35].

Finally, longitudinal research designs are suggested for future studies. Such designs would allow researchers to track changes in financial literacy over time and assess the long-term impact of financial education interventions and motivational factors on financial literacy development. This approach would provide a more nuanced understanding of how financial literacy evolves and the sustained effects of educational strategies tailored to students' needs.

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