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FINANCIAL LITERACY AMONG TURKISH COLLEGE STUDENTS: THE ROLE OF FORMAL EDUCATION, LEARNING APPROACHES, AND PARENTAL TEACHING[1]

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Summary.—This study assessed financial literacy and its correlates among Turkish college students, with special emphasis on the role of formal education, learning approaches, and parental influences. Financial literacy was measured by the College Student Financial Literacy Survey, which assesses knowledge in four areas: general financial management, saving and borrowing, insurance, and investing. 853 Turkish university students were administered the survey (416 men, 437 women; *M* age=20.3 yr., *SD*=0.6). The mean percentage of correct responses was 45% (*SD*=12.8%). Regression results showed that formal finance education in college, a deep approach to learning, and direct financial teaching by parents were significantly associated with higher financial literacy scores.

Financial literacy is essential for making informed consumer decisions and improving household financial well-being (Lusardi, 2008). The financial illiteracy of consumers leads to inefficient economic decisions (Lusardi & Mitchell, 2007), lower savings (Wickramasinghe & Gurugamage, 2012), and higher cost of borrowing for credit cards and mortgage loans (Huston, 2012). College students constitute a useful sample for investigating financial literacy, since financial knowledge is critical for these young consumers from 18 to 30 years of age. Research has shown that financial knowledge of university students has a positive correlation with higher future earnings capacity and a higher savings rate (Danes, 1994). Students who are financially illiterate face increased financial difficulties that continue into later years (Danes & Hira, 1987; Hira, 2002). The greater their financial literacy when they leave college, the fewer financial problems they may face in real life.

Increasing financial literacy is even more important in developing and emerging economies, where consumers have limited experience with formal financial systems (OECD, 2012). The objective of this study is to investigate the factors affecting financial literacy among Turkish college students. With an average annual real GDP growth rate of 5% between 2002 and 2012,

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Turkey has been one of the fastest growing countries in the world (ISPAT, 2013). However, the country's savings rate (14% in 2012)—vital to sustain this growth—remains low compared to historic rates and to rates in other countries in the world (IMF, 2013). One way to increase the savings rate would to be to focus on enhancing financial literacy (Ruhaak, 2013). Since a large proportion of people in Turkey do not use banks, greater financial literacy could increase the propensity to save and also motivate households to keep their savings in a bank account rather than at home (Ruhaak, 2013). Another trend Turkey has been experiencing over the last decade is the increase in the number and complexity of financial products and services offered to Turkish customers, many of whom lack the necessary skills and knowledge necessary to use these (FinancialCorps, 2014). As a result of these trends, financial literacy has become an important concern for policy makers and educators in the country (Yilmaz, 2011).

Defining and Measuring Financial Literacy

OECD (2012) defines financial literacy as "a knowledge and understanding of financial concepts and risks, and the skills, motivation and confidence to apply such knowledge and understanding in order to make effective decisions across a range of financial contexts, to improve the financial wellbeing of individuals and society, and to enable participation in economic life" (p. 13). This definition includes two dimensions: the knowledge of financial concepts and the ability to use that knowledge (Huston, 2010). However, the terms financial knowledge and financial literacy have often been used interchangeably in the previous literature (Huston, 2010). Jorgensen and Savla (2010) conceptualized financial literacy as the relationships among financial knowledge, financial attitudes, and financial behavior. In this study, the focus was financial knowledge because it is more readily measured and well-defined.

There is no standardized instrument to measure the construct of financial literacy (Huston, 2010). Both self-report methods and performance tests have been used in previous research. Self-reports assess perceived knowledge or confidence in knowledge (i.e., how much respondents think they know). Objective instruments are primarily knowledge-based. For adults, Lusardi (2008) developed a set of three "basic" and eight "sophisticated" financial literacy questions which have been used in recent research, either in their original forms or as part of a larger questionnaire (Knoll & Houts, 2012). A questionnaire which was designed specifically for high school students was the Jump$tart survey, which measures American students' financial literacy with a test consisting of 31 questions (Mandell, 2009). Starting in 2008, the same set of questions was also administered to college students. The average score in the last Jump$tart survey was 61.9%

for college students and 48.3% for high school seniors. Another survey developed specifically for college students by Jorgensen (2007) is the College Students Financial Literacy Survey (CSFLS), which includes 27 questions measuring knowledge on four areas: general financial knowledge, saving and borrowing, insurance, and investing. Data collected from 450 students yielded an overall mean financial knowledge score of 57.6%. The criterion and face validity of the scale were assessed by a panel of four experts and Cronbach's α internal consistency reliability was calculated to be .75 (Jorgensen & Savla, 2010; Hancock, Jorgensen, & Swanson, 2012).

Factors Affecting Financial Literacy among College Students

Outside of Turkey, several studies investigated the factors affecting financial literacy among college students. Earlier studies generally focused on sociodemographics as correlates of financial literacy. In one of the first studies to examine financial literacy among college students, Danes and Hira (1987) surveyed 323 students from a university in the United States. The study tested students' insurance knowledge with six questions, credit card knowledge with eight questions, and knowledge of general financial management with 18 questions. The mean percentages of correct scores in these areas were 49%, 66%, and 57%, respectively. The authors also estimated linear regression models to analyze the factors affecting students' knowledge scores. The first model, which explained 8.64% of the variance in general financial management scores, showed that male students ($\beta = 0.11$) and married students ($\beta = 0.23$) were more knowledgeable. The second model analyzed the correlates of insurance knowledge and showed that male students had higher knowledge than female students ($\beta = 0.14$) and that students with higher income were more knowledgeable ($\beta = 0.18$). The model explained 9.77% of the variance in insurance knowledge scores. The third model explained 15.5% of the variance in credit card knowledge scores and showed that students who were employed ($\beta = 0.25$) and had higher class ranks ($\beta = 0.25$) were more knowledgeable.

Another study by Volpe, Chen, and Pavlicko (1996) surveyed 454 undergraduate business students from a university in the United States using an instrument of 23 items focusing mainly on investment knowledge. The overall mean of the correct responses in their sample was 44%. Moreover, the authors documented that on average male students scored seven points higher than female students ($\varphi = 0.11$). This finding was also confirmed by Goldsmith and Goldsmith (1997), who tested college students' perceived and real investment knowledge. In their sample ($N = 457$), men scored higher than women both in terms of perceived knowledge score (18.1 vs 15.3 out of 30, $d = 0.58$) and actual knowledge score (2.8 vs 2.0 out of 6, $d = 0.38$). Furthermore, the authors found that age was correlated with

real knowledge ($r = .19$). In a follow-up study, Goldsmith, Goldsmith, and Heaney (1997) investigated perceived and real investment knowledge in a new sample consisting of 115 college students and controlled for students' major area. A 2 × 2 analysis of variance (sex × major) showed that men had significantly higher subjective knowlege ($\beta = 0.38$) and higher real knowledge ($\beta = 0.18$) compared to women. In addition, business majors demonstrated higher subjective ($\beta = 0.49$) and real knowledge ($\beta = 0.37$). The overall R^2 values were .45 and .19 for subjective and real knowledge, respectively.

A study by Chen and Volpe (1998) used data from 924 college students in 13 universities in the United States and found that average financial literacy is low among college students based on their responses to a 36-question survey covering general financial knowledge, saving and borrowing, insurance, and investments. On the average, students answered 52.9% of financial knowledge questions correctly. Results showed that business majors scored higher than non-business majors (60.7% vs 49.9%, $d = 7.21$) and that men scored higher than women (57.4% vs 50.8%, $d = 2.09$). Students who are older, with higher income, more work experience, and higher class rank were also found to be more knowledgeable. For instance, there was an 8-point difference between the scores of students in the age range 18–22 years and those in the age range 23–29 years. Students with yearly income below $10,000 scored 6 points lower than those who earned $50,000 or more. Similarly, students who had between 0 and 2 years of work experience scored 6 points higher than those with no work experience. The mean percentage of correct responses was 46.2% for freshmen and 52.9% for seniors. Using the same dataset and focusing on sex differences in financial literacy, Chen and Volpe (2002) reported that women scored lower than men on 22 out of 36 questions and earned a higher score in only one question. In addition, the authors reported that women generally had less confidence in and lower motivation to learn personal finance topics. They also confirmed the findings of Chen and Volpe (1998) that men and students who are older, with higher income, more work experience, and higher class rank were more knowledgeable, using a logistic regression model (adjusted $R^2 = .33$). However, Wagland and Taylor (2009) tested the validity of Chen and Volpe's (1998, 2002) findings in a sample of college students from Australia and could not find a significant relationship between financial literacy scores and personal characteristics such as age, sex, or work experience.

In a more recent study, Lusardi, Mitchell, and Curto (2010) investigated the factors affecting financial literacy among young people (23 to 28 years old) using data from the National Longitudinal Survey of Youth Women ($N = 7{,}417$), which included three questions to measure financial literacy. The first question measured the knowledge of interest rates, the

second one was related to inflation, and the last one was about risk diversification. The mean percentage of correct responses to these questions were 79%, 54%, and 47% respectively. Through a probit model, the authors showed that men were 6% more likely to give a correct response to the interest rate question, 15% more likely to answer the inflation question correctly, and 16% more likely to answer the diversification question correctly. In addition, results showed that students' cognitive ability as measured by their ASVAB scores was positively associated with financial literacy. However, pseudo R^2 values were reported as .026 to .12, depending on model specification, which indicates most of the variance in knowledge was not tapped by these variables. In another study, Barboza, Smith, and Pesek (2014) tested the effect of academic ability (as measured by GPA) on college students' ($N=377$) financial knowledge measured using a set of three questions. The percentage of students who answered correctly ranged from 27% to 47%. Probit results indicated that a one-point decrease in GPA reduced the chance that a student would answer correctly by 82% for the most difficult question and 103% for the simplest question. However, the role of academic ability in explaining financial literacy was not supported by Sabri, Cook, and Gudmunson (2012), who used data from a sample of 2,519 Malaysian college students. The authors used students' answers to a 25-item quiz to calculate financial literacy scores, and the results of structural equation modeling showed that GPA was not a significant predictor of financial literacy. On the other hand, students who lived off campus were found to be slightly more knowledgeable in personal finance ($\beta=0.08$).

In addition to sociodemographics, previous literature also tested family characteristics as correlates of financial literacy. Mandell (2009) found a relationship between financial literacy scores and parents' education and income using results from the 2008 Jump$tart survey of college students ($N=1{,}030$): if neither parent completed high school, the mean score was 54.3%; for those who had at least one parent who completed college, the mean score was 64%. Similarly, for students whose parents earned less than $20,000 per year, the mean score was 51.9%, and for those whose parents had yearly incomes higher than $80,000 it was 64.9%. In another study, Murphy (2005) surveyed 277 college students in the United States and calculated financial literacy scores based on their answers to a 10-item multiple choice quiz ($M=31.6\%$). The author found that the average financial literacy score, if neither parent completed high school, was 13% ($d=3.87$) lower than the average score for those who had at least one parent who was a high school graduate.

Previous literature includes studies of financial literacy from the perspective of socialization. For example, Jorgensen (2007) used the College

Student Financial Literacy Survey (CSFLS) in 450 college students; those who reported they had learned "some" or "a lot" about managing their money from their parents were more knowledgeable than students who reported learning "none" or "not much" (16.21 vs 15.96 out of 27; $d=3.75$). In another study using the same dataset and SEM, Jorgensen and Savla (2010) showed that parental influence was a significant predictor of positive financial attitudes ($\beta=0.25$). A more recent study using data from the CSFLS by Hancock, *et al*. (2012) indicated that students who had parents who argued about finances were 2.8 times more likely to engage in bad financial behaviors, such as having excess credit card debt. Another form of financial socialization suggested in the literature occurs through courses taken in high school or university. For instance, Shim, Xiao, Barber, and Lyons (2009) collected data from 781 college students at a university in the United States and asked the respondents to assess their own subjective financial knowledge on a scale from 0 to 4. Students were also asked whether their parents spoke with them about four different personal financial topics to calculate a parental socialization score. SEM indicated that both parental socialization ($\beta=0.25$) and education socialization as measured by finance classes taken ($\beta=0.14$) had positive and statistically significant effects on subjective financial knowledge. This finding was supported by Shim, Barber, Card, Xiao, and Serido (2010), using a larger dataset consisting of 2,098 college students ($\beta=0.43$ for parental socialization; $\beta=0.26$ for education socialization). In addition, high school work experience was a significant predictor of finanancial knowledge ($\beta=0.15$).

A gap in the literature is the lack of empirical research on the relationship between learning approaches and financial literacy. In general, the distinction between deep and surface learning is widely accepted to have conceptual and predictive utility in learning outcomes (Elliot, McGregor, & Gable, 1999; Entwistle, 2000). Deep processing, also called critical thinking, involves questioning the validity of new information and trying to integrate it with previous knowledge and experience (Elliot, *et al*., 1999; Dart, Burnett, Purdie, Boulton-Lewis, Campbell, & Smith, 2000). Surface processing, on the other hand, involves routine reproduction and memorization of new information (Elliot, *et al*., 1999; Dart, *et al*., 2000). Students who study motivated by fear of failure are more likely to use a surface approach, while those who are internally motivated mostly prefer a deep approach (Watkins & Dahlin, 1997). Previous studies have found that deeper approaches to learning result in better learning outcomes in general (Trigwell, Prosser, & Waterhouse, 1999). For instance, Gadzella, Ginther, and Williamson (1987) found that deeper learners have higher GPA. In contrast, Rose, Hall, Bolen, and Webster (1996) did not find a relationship between students' GPA and learning approaches [however, Biggs

(1997) suggested that since their data was collected from a single class, the prevailing conditions might be atypical]. For Turkish students, very weak relations between GPA and deep approach ($r = .17$) and between GPA and surface approach ($r = -.19$) have been documented in a sample of 3,428 college students (Ekinci, 2009).

As is clear from the preceding discussion, research on college students' financial literacy has mostly used samples from developed countries. Empirical evidence on financial literacy of Turkish college students is scarce. One notable exception is Altintas (2011), who surveyed a sample of 337 university students using a 28-question financial knowledge test. The mean percentage of correct responses in their sample was only 39.2%, and the most important factors that affected financial literacy were found to be class rank, age, family's income, and discussion with parents. Also notable is the study by Temizel and Bayram (2011), who assessed college students' ($N = 433$) subjective financial knowledge on seven areas using a scale from 1 to 5. The mean financial knowledge score in their sample was 2.15 ($SD = 0.38$). The authors did not investigate the factors affecting financial knowledge.

The present study attempts to fill the gap in the literature related to financial literacy among college students in developing countries by using data collected from a university in Turkey to investigate the factors affecting students' financial literacy. Another contribution of the study is to investigate the effect of learning approaches on students' financial literacy. Based on previous studies of financial literacy and on the effect of learning approaches on learning outcomes in general, the following hypotheses are proposed.

Hypothesis 1. The following personal characteristics will be associated with greater financial literacy: being male, greater age, higher GPA, living off-campus, and having work experience.

Hypothesis 2. The following family characteristics will be associated with greater financial literacy: higher parental income, having parents who are college graduates, and having parents who are employed.

Hypothesis 3. A higher number of finance-related classes taken in college and deeper learning approaches in these classes will be associated with greater financial literacy, while surface learning approaches will be associated with lower financial literacy.

Hypothesis 4. Direct teaching of finance by parents will be associated with greater financial literacy.

Method

Participants and Procedure

The data for this study comes from an online survey of undergraduate students in a Turkish university in Istanbul conducted at the end of the spring semester of 2013. The sample consisted of full-time students registered in the School of Economics and Administrative Sciences. This school was chosen because students take several compulsory and/or elective courses relevant to financial literacy, and this will allow investigation of the effect of formal education on students' financial knowledge.

After a first invitation to complete the online questionnaire, reminder e-mails were sent one week and two weeks later. The questionnaire included a total of 60 questions and took approximately 30 min. to complete. The questions' content is related to financial literacy (27), background information about students (12), parental financial teaching (1), and learning approaches (20).

In total, 2,000 students were contacted; of these, 962 responded to the survey, for a response rate of 48%. Unreliable responses, with the entire set of questions in a section left unanswered or with the same answer to all questions, were left out of the analysis. The final sample consisted of 853 students, including 416 men and 437 women. The mean age was 20.3 yr. ($SD = 0.6$). Grade levels were represented within the sample as follows: 27.3% of respondents were freshmen, 39.3% were sophomores, 13.4% were juniors, and 20% were seniors. The majority of students were business majors (23%), followed by economics (17%), and international trade (16%).

Measures

Financial literacy.—Financial literacy was measured using the College Student Financial Literacy Survey (CSFLS) developed by Jorgensen (2007). An objective instrument measuring financial knowledge was preferred over self-reports of perceived financial literacy because people often think that they know more than they actually do (OECD, 2012). This finding has been demonstrated not just in financial matters, but across a wide range of knowledge and abilities (Alba & Hutchinson, 2000).

The CSFLS includes 27 questions measuring financial knowledge and covers four content areas: general financial knowledge, saving and borrowing, insurance, and investing. The general financial knowledge section consists of 11 items such as "Net worth is…." or "In which year after a car is bought does it lose its value the fastest?" The saving and borrowing section includes six questions. Some sample questions from this section are "The most important factors that lenders use when deciding whether to approve a loan are…" or "If you co-sign a loan for a friend then you…" The third section pertains to insurance and consists of six questions (e.g.,

"The main reason to purchase insurance is to…"). The final section is related to investing and includes four items (e.g., "Which of the following investments is most risky?").

The survey was first translated into Turkish before being administered to students. It was then back-translated independently into English to check for possible inconsistencies. Although the questions in the CSFLS were quite general, four of the questions were modified to fit the context of the Turkish financial marketplace. Dollar values in numerical questions were replaced by Turkish Lira values to ensure better understandability and American person names were replaced by Turkish names. All the questions in the CSFLS are in multiple choice format, and respondents are asked to choose the correct response from 4 or 5 alternatives. Responses were scored 1 (correct) or 0 (incorrect) and then summed. Missing responses were treated as incorrect. Thus, possible financial literacy scores ranged from 0 to 27. Cronbach's α of the scale in this study's sample was adequate (α = .82).

Personal characteristics.—Sex, age, place of residence during school year, work experience, and cumulative grade point average were examined as potential correlates of financial literacy levels. Sex was a dummy variable, 1 = male and 0 = female. Age was a continuous variable which denotes the age of the respondent in years. Students were asked to report their place of residence during school year. Alternatives included "at home with parents," "on campus residential hall," "off campus apartment." Based on these responses, three dummy variables, At home, On campus, and Off campus, were defined, with the first category as the reference. To operationalize general academic achievement, students were asked to report their cumulative grade point average (GPA), defined as a continuous variable ranging from 0 to 4. Finally, students were asked whether they had ever worked in a paid job, either full-time or part-time; this dummy variable was scored 1 = students who have reported some type of work experience and 0 = no work.

Family characteristics.—To operationalize socio-economic status, family income, parental employment status, and parental education were separately incorporated in the model to investigate their effects independently. To measure income, students were asked to report their parents' monthly net income. Since the majority of Turkish students are financially dependent on their parents for living expenses, parents' income was more relevant than students' own income. In the financial literacy literature, income is generally used as a categorical rather than a continuous variable (e.g., Chen and Volpe, 1998, 2002). Accordingly, the following three categories were defined: low income if parents' net income is lower than TL 2000 per month; middle income if net monthly income was between TL 2000 and TL 5000; and high income for monthly net income greater than

TL 5000. High income was arbitrarily selected as the reference group. For parental education, two dummy variables were created: mother's education was a dummy variable equal to 1 for those students whose mothers were college graduates. Similarly, father's education was 1 for students whose fathers were college graduates. Parents' occupational status was measured in a similar way by two dummy variables: mother's occupation was 1 for students whose mothers were employed full-time (0 otherwise), and father's occupation was 1 for students whose fathers worked full-time (0 otherwise).

Formal financial education.—As in Shim, *et al*. (2010), students were asked to report the number of courses relevant to financial literacy (e.g., financial management, corporate finance, economics, introduction to business) they had taken in college; this was defined as a continuous variable. The minimum possible value of Courses was 1, since all students in the School of Economics and Administrative Sciences take at least one compulsory economics course during their first year. The maximum value was 9.

Learning approaches.—To measure learning approaches, the Revised Two Factor Study Process Questionnaire (R–SPQ-2F) developed by Biggs, Kember, and Leung (2001) was used. The questionnaire consists of two scales named deep approach and surface approach, which include 10 items each. Biggs, *et al*. (2001) note that the scores can be used at "presage" level to assess how individuals differ in terms of their preferred approaches to learning, at "process" level to assess how individuals handle a given task, and at "product" level to evaluate teaching contexts. R–SPQ-2F asks the students to indicate the extent to which a given statement is true of them on a five-point scale where 1: This item is never or only rarely true of me and 5: This item is always or almost always true of me. The deep approach scale contains five items related to students' motives (e.g., "I find that at times studying gives me a feeling of deep personal satisfaction") and five items related to students' strategies (e.g., "I find that I have to do enough work on a topic so that I can form my own conclusions before I am satisfied"). The surface approach scale also includes five motive items (e.g., "I find it is not helpful to study topics in depth. It confuses and wastes time, when all you need is a passing acquaintance with topics") and five strategy items (e.g., "I learn some things by rote, going over and over them until I know them by heart even if I do not understand them").

In cases where students might feel that their answer depended on the subject, they were asked to refer to courses relevant to finance. Accordingly, the variables deep approach and surface approach were generated by taking the average of the 10 corresponding items. Possible values for these variables range from 1 to 5. Cronbach's α values for the deep approach and surface approach scales were .77 and .83, respectively.

Parental financial teaching.—Direct teaching of financial knowledge by parents was measured by asking the respondents to indicate whether their parents spoke with them about the following four major topics while they were growing up: the importance of savings, the family spending plan, the student's own spending, and the use of credit (Shim, *et al*., 2009). Accordingly, the variable Parental teaching was defined ranging from 0: No discussion in any of the areas to 4: Discussion in all areas.

Analysis

Hierarchical regression analysis was performed using four different models. The baseline model represents general personal variables, and contains background characteristics including sex, age, place of residence, GPA, and work experience as explanatory variables. The second model represents effects related to the family and includes variables related to socio-economic status such as family income, parents' education level, and parents' occupational status. The third model represents the effects of formal financial education and incorporates the number of relevant courses completed by the students and their learning approaches (scores for deep and surface approaches) in these courses. Finally, the last model adds parental financial teaching scores as the explanatory variable. Before proceeding with estimation, multicollinearity was checked by ensuring that pairwise correlations among independent variables did not exceed .70 (Lehmann, Gupta, & Steckel, 1988) and variance inflation factors (VIFs) did not exceed 10 (Hair, Black, Babin, & Anderson, 2009).

Results

Descriptive statistics related to financial literacy scores are presented on Table 1. First, it should be noted that financial literacy among Turkish college students in this sample is low, as evidenced by an average financial knowledge score of 12.15 out of a possible 27 ($SD = 3.46$). This means that an average student could not even answer half of the questions correctly. The minimum score was 2 and the maximum score 26. No student was able to answer all questions correctly. Scores on general knowledge

TABLE 1
Descriptive Statistics on Financial Literacy Scores Based on the CSFLS

Variable	*n*	Min.	Max.	*M*	*SD*	Percent Correct (%)
General knowledge	853	0	11	5.18	1.57	47
Saving and borrowing	853	0	6	2.86	1.82	48
Insurance	853	0	6	2.69	1.25	45
Investment	853	0	4	1.42	0.79	24
TOTAL	853	2	26	12.15	3.46	45

items ranged from 0 to 11 ($M=5.18$, $SD=1.57$), while scores on saving and borrowing items ranged from 0 to 6 ($M=2.86$, $SD=1.82$). The insurance items yielded a range of 0 to 6 ($M=2.69$, $SD=1.25$). Finally, the scores for investment items ranged from 0 to 4 ($M=1.42$, $SD=0.79$). According to these results, investment seems to be the content area with which students are least familiar, with a mean of 24% of correct responses, while average scores on general knowledge, saving and borrowing, and insurance were similar, at 47%, 48%, and 45%, respectively.

Descriptive statistics on independent variables are defined on Table 2. As can be seen, 416 of the 853 students were male. The average age was 20.3 yr. ($SD=0.57$). During the school year, 41% of the respondents lived on campus in residential halls, 34% lived in off-campus apartments, and

TABLE 2
DESCRIPTIVE STATISTICS ON INDEPENDENT VARIABLES

Description	*N*	Min.	Max.	*M*	*SD*
Respondent's sex (male=1)	853	0	1	0.49	0.50
Age, yr.	852	18	27	20.26	0.57
Respondent lives at home with parents during the school year (Yes=1)	853	0	1	0.25	0.43
Respondent lives in campus residential hall during the school year (Yes=1)	853	0	1	0.41	0.49
Respondent lives in an off-campus apartment during the school year (Yes=1)	853	0	1	0.34	0.47
Self-reported cumulative GPA	849	0	4	2.31	0.55
Respondent indicated having work experience (Yes=1)	853	0	1	0.75	0.43
Respondent's parents' monthly household income is less than TL 2000 (Yes=1)	847	0	1	0.33	0.47
Respondent's parents' monthly household income is between TL 2000 and TL 5000 (Yes=1)	847	0	1	0.37	0.48
Respondent's parents' monthly household income is greater than TL 5000 (Yes=1)	847	0	1	0.30	0.46
Mother is college graduate (Yes=1)	853	0	1	0.40	0.49
Father is college graduate (Yes=1)	853	0	1	0.64	0.48
Mother is working full-time (Yes=1)	853	0	1	0.24	0.42
Father is working full-time (Yes=1)	853	0	1	0.76	0.43
Number of relevant courses taken	852	1	9	2.93	1.04
Deep approach score	849	1	5	2.22	0.65
Surface approach score	849	1	5	3.19	0.72
Score on parental teaching scale	849	0	4	1.53	1.10
Valid *N* (listwise)	833				

25% lived at home with their parents. The mean GPA of students was 2.31 ($SD = 0.55$), and 75% reported having some type of work experience. Of the students, 30% were in the high income group, 37% in the middle income group, and 33% in the low income group. Respondents whose mothers were college graduates constituted 40% of the total sample, but only 24% of mothers were working full-time. Respondents whose fathers were college graduates constituted 64% of the sample, and 76% of fathers were working full-time. This profile was quite typical for Turkish families where fathers work and mothers are housewives (Dincer & Uysal, 2010). An average student had taken approximately three courses ($SD = 1.04$) relevant to financial literacy. As for parental teaching scores, on the average 1.5 of the 4 items ($SD = 1.10$) were discussed within families. However, it should be noted that these student reports were not independently validated by the parents. Finally, the average deep learning score was 2.22 ($SD = 0.65$), while the mean surface learning score was 3.19 ($SD = 0.72$).

The results of all four regression models are presented in Table 3. The first model showed that men and students who are older had higher financial literacy scores. Students who live in residence halls or in off-campus apartments had higher financial literacy compared to those who lived with their parents during the school year. Similarly, students who indicated having already been employed in a paid job tended to achieve higher financial literacy scores. On the other hand, cumulative GPA did not seem to predict financial literacy scores. The second model considered the effect of socio-economic status and showed that the students whose fathers are at least college graduates scored higher on financial literacy. The same holds for mothers' education. In addition, students whose fathers worked full time had higher financial literacy scores. However, mothers' employment status and family income did not affect students' financial literacy scores.

According to the results of the third model, students' financial knowledge increased with the number of relevant courses taken. In addition, students who have higher deep approach scores were more financially knowledgeable, while higher surface approach scores are associated with lower financial literacy. It is also interesting to note that when study strategies were introduced into the model, sex became non-significant. To investigate this issue further, the average scores of male and female students were compared on deep approach and surface approach scales. While there was no significant difference in terms of surface approach scores, male students scored 1.1 points higher than female students on the deep approach scale and the difference was statistically significant ($t_{847} = 6.1$, $p < .001$, $d = 1.88$). Hence, higher financial literacy scores achieved by male students could be explained by their more frequent use of deep learning approaches. Finally, the fourth model indicated that students who discussed more financial issues with their parents while growing up were more financially knowledgeable.

TABLE 3
MULTIPLE LINEAR REGRESSION MODELS

Variable	Step 1					Step 2				
	B	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*
Intercept	1.64	4.19		0.39	.695	0.35	4.12		0.08	.933
Respondent's sex	0.45	0.23	0.06	1.92	.055	0.42	0.23	0.06	1.86	.063
Age	0.44	0.20	0.07	2.13	.034	0.43	0.20	0.07	2.12	.034
Residence on campus	0.91	0.29	0.13	3.10	.002	0.84	0.29	0.12	2.86	.004
Residence off-campus	1.25	0.31	0.17	4.10	< .001	1.20	0.31	0.16	3.92	< .001
GPA	−0.25	0.21	−0.04	−1.19	.235	−0.19	0.20	−0.03	−0.93	.352
Work experience	1.82	0.27	0.23	6.82	< .001	1.78	0.26	0.22	6.84	< .001
Middle income						0.10	0.27	0.01	0.35	.724
High income						−0.39	0.29	−0.05	−1.31	.190
Mother's education						1.18	0.26	0.17	4.56	< .001
Father's education						0.71	0.26	0.10	2.71	.007
Mother's occupation						0.44	0.27	0.05	1.60	.110
Father's occupation						0.61	0.27	0.08	2.23	.026
	R^2 = .09; Adj. R^2 = .08					R^2 = .14; Adj. R^2 = .13				
	SE = 3.35; $F_{6, 826}$ = 12.8‡					*SE* = 3.29; $F_{12, 820}$ = 10.9‡				
	Step 3					Step 4				
	B	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*
Intercept	−2.42	4.07		−0.59	.553	−2.78	4.05		−0.69	.494
Respondent's sex	0.18	0.23	0.03	0.79	.433	0.18	0.22	0.03	0.80	.423

(continued on next page)

Note.—ΔR^2 = .05 ($F_{6, 820}$ = 12.4, p < .001) for Step 2, .05 ($F_{3, 817}$ = 8.21, p < .001) for Step 3, and 0.01 ($F_{1, 816}$ = 4.34, p = .04) for Step 4. ‡p < .001.

TABLE 3 (CONT'D)
MULTIPLE LINEAR REGRESSION MODELS

Variable	Step 3					Step 4				
	B	*SE*	β	*t*	*p*	*B*	*SE*	β	*t*	*p*
Age	0.51	0.20	0.08	2.62	.009	0.50	0.19	0.08	2.57	.010
Residence on campus	0.76	0.29	0.11	2.63	.009	0.72	0.29	0.10	2.52	.012
Residence off-campus	1.10	0.30	0.15	3.61	< .001	1.02	0.30	0.14	3.36	.001
GPA	−0.23	0.20	−0.04	−1.15	.250	−0.24	0.20	−0.04	−1.20	.230
Work experience	1.66	0.25	0.21	6.52	< .001	1.68	0.25	0.21	6.61	< .001
Middle income	0.06	0.27	0.01	0.21	.834	0.12	0.27	0.02	0.46	.645
High income	−0.36	0.29	−0.05	−1.24	.215	−0.33	0.29	−0.04	−1.14	.257
Mother's education	1.07	0.25	0.15	4.22	< .001	1.01	0.25	0.14	3.99	< .001
Father's education	0.69	0.25	0.10	2.72	.007	0.67	0.25	0.09	2.62	.009
Mother's occupation	0.34	0.27	0.04	1.26	.208	0.37	0.27	0.04	1.38	.169
Father's occupation	0.60	0.27	0.07	2.24	.025	0.59	0.27	0.07	2.22	.027
Courses	0.18	0.11	0.05	1.71	.087	0.19	0.11	0.06	1.76	.079
Deep approach	0.26	0.04	0.05	6.14	< .001	0.53	0.08	0.10	6.34	< .001
Surface approach	−0.23	0.04	−0.05	−5.34	< .001	−0.44	0.08	−0.09	−5.21	< .001
Parental teaching of finance						0.29	0.10	0.09	2.81	.005
	R^2 = .19; Adj. R^2 = .17					R^2 = .19; Adj. R^2 = .18				
	SE = 3.23; $F_{15,817}$ = 12.5‡					*SE* = 3.14; $F_{16,816}$ = 12.3‡				

Note.—ΔR^2 = .05 ($F_{6,820}$ = 12.4, p < .001) for Step 2, .05 ($F_{3,817}$ = 8.21, p < .001) for Step 3, and 0.01 ($F_{1,816}$ = 4.34, p = .04) for Step 4. ‡p < .001.

Discussion

The objective of the present study was to investigate the factors affecting financial literacy among Turkish college students. Despite all the students having taken at least one course related to financial literacy, the mean percentage of correct responses was only 45%. This result is similar to a number of previous studies (e.g., Volpe, *et al*., 1996; Goldsmith & Goldsmith, 1997) and worse than some others (e.g., Chen & Volpe, 1998, 2002; Mandell, 2009; Lusardi, *et al*., 2010). Data collected on U.S. students using the CSFLS yielded an average score of 57.6% (Jorgensen, 2007). The only study on Turkish college students (Altintas, 2011) employed an objective measure of financial knowledge and yielded a mean score of 39.4%, which is slightly lower than the average score in the current sample. This finding points to a critical need to financially educate college students, who will become future consumers, workers, and investors.

The percentage of total variance in financial literacy scores explained by this study's model was 8.5% when only personal characteristics were considered. This value is similar to R^2 values obtained by Danes and Hira (1987) for general financial management knowledge ($R^2 = .09$) and investment knowledge ($R^2 = .10$). When family characteristics were considered, there was a 5.3% increase in variance explained. When courses were included, R^2 further increased by 4.8%. The final model incorporating direct teaching by parents explained 19.4% of variance in financial literacy scores. Although values are not directly comparable due to differences in methodologies, this R^2 value is higher than the value obtained by Lusardi, *et al*. (2010) but lower than the one obtained by Chen and Volpe (2002).

Consistent with Hypothesis 1, most personal characteristics, with the exception of GPA, were found to be associated with financial literacy. The empirical results showed that male students tend to have greater financial knowledge than female students. This result is consistent with studies in the previous literature (Danes & Hira, 1987; Volpe, *et al*., 1996; Goldsmith & Goldsmith, 1997; Goldsmith, *et al*., 1997; Chen & Volpe, 1998, 2002; Lusardi, *et al*., 2010; Altintas, 2011). Another finding is that students' financial literacy increased with age. This finding is also consistent with prior studies (Goldsmith & Goldsmith, 1997; Chen & Volpe, 1998, 2002; Altintas, 2011) and may be due to the fact that older students had more time to accumulate financial knowledge through courses, seminars, and their own or others' experience (Chen & Volpe, 2002). Older students may also be more motivated to learn about financial issues because they are closer to being on their own (Jorgensen & Savla, 2010). In addition, students living away from their parents and students with work experience tended to achieve higher financial literacy scores. This might be expected because they likely have more financial responsibilities, dealing with their

expenses by themselves and acquiring greater financial knowledge (Sabri, *et al*., 2012). Similarly, students who worked at a paid job tended to have greater financial literacy, again likely due to the fact that they earn their own money and have direct experience managing it. This result is consistent with other studies (Chen & Volpe, 1998, 2002; Shim, *et al*., 2010) and implies that hands-on experience is important to improve financial literacy. Surprisingly, the cumulative GPA of students had no significant relationship to financial literacy.

The finding that students whose parents were college graduates had higher financial literacy is consistent with Hypothesis 2 and supports what other studies have found (Murphy, 2005; Mandell, 2009). This might be due to the fact that parents with higher education are more knowledgeable and also spend more time discussing financial issues with their children (Jorgensen & Savla, 2010). In addition, educated parents have better access to economic and social resources (Engin-Demir, 2009). In addition, full-time employment of the father was found to have a positive effect on students' financial literacy. This association might be due to the fact that fathers who work full-time have more experience to share with their children. Also, as suggested by Dincer and Uysal (2010) within the context of mathematical literacy, it might be the case that fathers who are employed have an opportunity to observe the returns of education in the labor market more closely, and hence place greater emphasis on the financial education of their childen.

Contrary to Hypothesis 2 and previous studies (Mandell, 2009; Altintas, 2011), family income did not turn out to be a significant predictor of financial literacy. Intuitively, this variable might be expected to affect students' scores because wealthier families provided their children with more educational resources and may have more interaction with them on investment and saving issues (Jorgensen & Savla, 2010). However, there is also evidence that wealthier parents have a tendency to shield their children from financial realities so that these students have lower financial literacy (Murphy, 2005; Mandell, 2009). It might be the case that these two effects obscured each other for the students in this sample, but a more refined measurement would be needed to tease out these issues.

Consistent with Hypothesis 3 and previous studies (Shim, *et al*., 2009; Shim, *et al*., 2010), formal education can contribute to financial knowledge. Those students who took a greater number of finance, economics, and business classes in college tended to achieve higher financial literacy scores. Results also indicated that deep learning approaches were associated with a positive effect on financial literacy scores even after controlling for the number of courses taken, while surface learning was associated with a negative effect. In the Turkish culture, memorization is considered a valuable strategy

among college students, probably due to the university admittance system that selects students solely on the basis of their scores on a multiple choice examination (Berberoglu & Hei, 2003). Memorization could be a habit that students continue in their college classes, so instructors should use strategies to promote deep learning approaches, such as using assessments that require deep thinking, or relating the material to real-life examples and students' previous knowledge to increase students' financial literacy (Entwistle, 2000). However, these issues should be tested by further research. The men in this sample tended to report using deep approaches more than women. As a result, the effect of sex on financial literacy disappeared when learning approaches were controlled. The reasons behind men's more frequent report of deep learning could be a topic for further research.

A final finding that emerged from the analysis is that financial teaching by parents had a positive effect on students' financial literacy, supporting Hypothesis 4. This result, consistent with other studies (Jorgensen, 2007; Shim, *et al*., 2009; Shim, *et al*., 2010; Altintas, 2011), implies that financial education should start at home. A valuable approach could be the creation of a teaching module for students to share with their parents as part of a finance class project. Parents need to be aware of the role they are playing in the financial socialization of their children and should discuss financial matters with them. The role of parents is even more pronounced in the Turkish culture since parents tend to isolate their children from realities of real life and financially support them until they get married (Yesilada & Ucel, 2009).

One limitation is that data were collected from a single university. Results from a nationally representative sample of college students would be useful. Another limitation of the study is its cross-sectional nature. Since data were collected at one time, no causality can be assumed. Comparing pre- and post-financial knowledge scores of students currently enrolled in finance-related classes, workshops, and seminars would be a fruitful area of further research. Another limitation is that only student data were collected. Data from both students and parents could be useful to operationalize parental influences. Finally, further research could investigate the effect of additional explanatory variables such as motivational factors, ethnicity, or students' city of origin on financial literacy scores, as well as the effect of financial literacy education on actual financial behavior.

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