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Title: School and family environments promote adolescents' financial confidence : Indirect paths to financial literacy skills in Finnish PISA 2018

Year: 2023

Version: Accepted version (Final draft)

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Please cite the original version:

Silinskas, G., Ahonen, A. K., & Wilska, T. (2023). School and family environments promote adolescents' financial confidence : Indirect paths to financial literacy skills in Finnish PISA 2018. Journal of Consumer Affairs, 57(1), 593-618. https://doi.org/10.1111/joca.12513

Check for updates

Received: 25 May 2022 | Revised: 27 October 2022 | Accepted: 15 January 2023

DOI: 10.1111/joca.12513

RESEARCH ARTICLE

the journal of consumer affairs

WILEY

School and family environments promote adolescents' financial confidence: Indirect paths to financial literacy skills in Finnish PISA 2018

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Funding information
Academy of Finland, Strategic Research Council (SRC), Grant/Award Numbers: #327242, #327237; Academy of Finland, Academy Research Fellow, Grant/Award Numbers: #296082, #336148, #331525

Abstract

This study investigates the associations of adolescents' financial socialization factors—financial education in school and families—with financial confidence (i.e., confidence in using financial and digital financial services). In addition, we examine how financial socialization factors indirectly relate to financial literacy skills through financial confidence and the role of demographic factors (adolescent gender, grade level, parental education, family wealth) on financial socialization, financial confidence, and financial literacy scores. We used data on the 4328 Finnish 15-year-olds participating in the 2018 Programme for International Student Assessment (PISA). We measured financial literacy by cognitive test items and assessed financial socialization and financial confidence by adolescent questionnaires. First, the results showed that financial education in school positively predicted adolescents' confidence in using financial and digital financial services. Second, financial education at schools and in families indirectly predicted students' financial literacy through confidence in using digital financial services. Third, older adolescents were more exposed to financial education at school and in families, whereas adolescents from wealthier families and girls (vs. boys) were exposed

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to a more frequent discussion of financial matters with parents at home. Furthermore, the boys were more confident in using financial services than the girls, although the financial literacy score did not differ by gender; older adolescents were more confident in using financial services and achieved better financial literacy than younger ones. Finally, higher parental education in the family related to higher financial literacy but not to higher financial confidence, whereas family wealth was related to higher financial confidence but not financial literacy.

KEYWORDS

adolescents, financial confidence, financial literacy, financial socialization, PISA

1 | INTRODUCTION

Financial literacy is increasingly recognized as an essential 21st-century skill that allows individuals to understand financial information and, based on it, make confident decisions about financial matters (Lusardi, 2015; Moreno-Herrero et al., 2018). Owing to the rapid development of digital technology, young people have become an attractive market for e-commerce and digital financial service providers. Today, young people need to make financial decisions on a daily basis (Moreno-Herrero et al., 2018; Rantala et al., 2021). However, because they have limited experiences and abilities to make correct financial decisions (Arellano et al., 2014), it is imperative that young people are educated and have access to financial information as early as secondary school. In this way, adolescents will be able to learn how to make informed decisions and protect themselves against possible current and future financial risks (Silinskas, Ranta, et al., 2021; Wilska et al., 2023).

Schools and families are often perceived as essential agents in adolescents' financial socialization (Cordero et al., 2019; Moreno-Herrero et al., 2018). Although financial literacy skills are considered an important outcome of financial socialization, the direct relations are often empirically weak or nonexistent (e.g., Silinskas, Ahonen, et al., 2021), and the mechanisms through which financial literacy skills emerge are not well understood. Thus, empirical studies need to focus on identifying variables through which positive financial literacy outcomes might emerge. An individual's motivation is one such possible variable, as it is often a driving force of their skill development (Ryan & Deci, 2000, 2020; Silinskas & Kikas, 2019). In particular, motivation in terms of financial confidence or confidence in using financial services can explain the link between financial socialization at schools and homes and financial literacy skills (OECD, 2019).

Previous reports on data from the Programme for International Student Assessment (PISA) often emphasize financial literacy skills as an ultimate goal. However, we argue that financial confidence can be an equally important aspect of financial competence and thus can promote financial literacy skills (OECD, 2019). Furthermore, previous studies on PISA and financial literacy focused on cross-country comparisons and the role of socio-demographic background characteristics in explaining those differences (Lusardi, 2015; OECD, 2020). Thus, how factors

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related to the processes and outcomes of financial socialization, such as adolescents' interactions about financial matters with parents and teachers (Vosylis & Erentaite, 2020), may relate to confidence in financial literacy remains unclear. Moreover, an interesting question is whether financial socialization factors exert their effects on financial literacy through adolescents' confidence in their abilities to use financial services. Taken together, previous studies often considered several factors in isolation; however, including them in one model would provide us with a more comprehensive picture of the interrelations between financial socialization, financial confidence, financial literacy, and socio-demographic factors. The status of the PISA tool of financial literacy and its impact on educational policymaking is widely acknowledged. Therefore, the results of this study may be highly applicable in enhancing adolescents' financial literacy in schools and families. Consequently, the present study aimed to investigate the interrelation between financial socialization and confidence in using financial services among Finnish adolescents participating in PISA 2018. Furthermore, after taking into account socio-demographic factors, we explored how financial socialization relates to financial literacy scores through confidence in using financial services.

1.1 | Financial literacy skills and confidence in using financial services

The PISA framework (OECD, 2019) defines financial literacy as (1) skills and knowledge/understanding of financial concepts and risks and (2) motivation/confidence to apply such knowledge and skills across financial contexts (p. 128). To acknowledge the importance of financial literacy as early as during adolescence, the Organization for Economic Co-operation and Development (OECD) included financial literacy as an international option to be assessed in PISA. PISA 2012, 2015, and 2018 included the measurement of financial literacy alongside the usual domains of reading, math, and science literacy. When measuring financial literacy, PISA studies have primarily focused on the cognitive aspects of financial literacy and assessed adolescents' skills and knowledge of financial matters. These may include, for example, understanding of the key financial concepts, purpose and basic features of financial products, risks for financial well-being, and skills of managing and manipulating (e.g., assessing information, comparing, exploring, and evaluating) financial information (OECD, 2019). In 2018, Finland participated in the financial literacy PISA assessment for the first time and was ranked second among 20 countries. Finland's national mean score of 537 was significantly above the OECD average (505), significantly lower than Estonia's score (547), and did not differ much from the score of Canada (532), which ranked third (OECD, 2020). Despite the high ranking of Finnish 15-year-olds' PISA performance, little is known about what factors may predict adolescents' financial literacy proficiency in Finland. This knowledge could provide important practical implications for adolescents' financial development in other countries. Consequently, in the present study, we focus on the Finnish data set of financial literacy from PISA 2018 with the expectation of understanding what processes and variables can explain the high ranking in financial literacy.

Although PISA studies are mostly known for their cognitive assessments based on the OECD definition (OECD, 2019, p. 128), non-cognitive factors, such as motivational/confidence, are equally important when describing an individual's competence in financial literacy. An individual's financial confidence includes the motivation to seek information and advice concerning certain financial matters, to apply the knowledge in practice, and to manage emotional and

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psychological factors that affect financial decision-making (OECD, 2019). Thus, the second factor of financial literacy investigated in the present study was confidence in using financial services (Arellano et al., 2014; Lee & Mortimer, 2009; OECD, 2019). According to the financial literacy model (OECD, 2019) and previous research (Arellano et al., 2014; Bénabou & Tirole, 2002), adolescents' confidence in using financial services is positively related to financial literacy scores. Previous reports showed that this financial confidence significantly affected the PISA 2012 financial literacy scores among Spanish adolescents (Arellano et al., 2018). However, in PISA 2012, confidence was asked about as a general characteristic and not specifically regarding financial matters. Therefore, our study took one step further and investigated confidence specifically in the domain of financial literacy. Moreover, owing to the newly developed measures in PISA 2018 in response to the fast rate of digitalization, we investigated two types of confidence in using financial services: One related to using traditional financial services (e.g., paying bills and understanding bank statements and contracts), and another related to using digital financial services (e.g., paying with a mobile device and keeping track of one's bank balance). Because previous studies have not differentiated between these two aspects, we expected that both aspects of financial confidence (in using digital or nondigital financial services) would be positively related to the financial literacy scores.

Although previous research assumed (OECD, 2019) and reported (Arellano et al., 2018) associations between financial literacy skills and confidence in using financial services, the causality between the two cannot be tested owing to the concurrent assessment of the PISA data. However, previous studies have often assumed that confidence precedes behavior (Arellano et al., 2014; Cupák et al., 2021; Lee & Kim, 2020; Mandell & Klein, 2009; Porto & Xiao, 2016). Theoretically, the financial literacy framework (OECD, 2019) views financial confidence not only as a goal in itself but also as instrumental in building financial knowledge and skills (p. 129). Another widely acknowledged theory—the self-determination theory (Ryan & Deci, 2000, 2020)—also suggests that confidence precedes skills/performance. In particular, the theory posits that human development is taking place given that basic psychological needs are met. Namely, children's needs for competence, autonomy, and relationships need to be satisfied (intrinsic motivation) for positive child outcomes to emerge (e.g., performance). Thus, in our case, confidence in using financial services can be assumed to represent adolescents' intrinsic motivation (the degree to which children's needs are satisfied, especially the need for competence), which further promotes the skills and knowledge that were tested by the PISA financial literacy tests.

Finally, PISA literature has suggested that performance in financial literacy, mathematics, science, and reading are highly correlated (OECD, 2019). Previous large-scale international assessment studies (e.g., PISA, PIRLS) showed that confidence in terms of self-efficacy and self-concept predicted performance scores in mathematics (Alivernini et al., 2016; Liang, 2010), science (Alivernini & Manganelli, 2015), and reading (Alivernini, 2013). Based on this, we also expected confidence to predict financial literacy in our study.

1.2 | Financial socialization factors, financial confidence, and financial literacy skills

Within the PISA framework, the Financial Literacy Expert Group (FEG) recognized financial socialization as a key element for acquiring confidence and skills in financial literacy (OECD, 2019). Financial socialization provides access to various financial information and

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education sources, ranging from informal discussions with family members or friends to formal education at schools. The present study investigated the frequency and availability of two sources to access financial information: (1) lessons at schools and (2) parental involvement with financial matters. The PISA 2018 student questionnaire asked adolescents about the frequency with which they have heard/learned about certain financial literacy concepts or solved financial literacy–related tasks during school lessons in the last 12 months. The development of these questions is related to the opportunity to learn (OTL) approach. The OTL approach emphasizes that exposure to the curriculum content affects students' academic achievement (Rudeloff et al., 2019; Schmidt & McKnight, 1995). Schmidt et al. (2015) study on PISA 2012 data showed that OTL measures were significantly related to students' mathematics performance. Siegfried and Wuttke (2021) recently found that OTL also had a positive effect on the financial literacy of young people, but the effect had a clear gender difference. According to their study, OTL significantly affected only young females' financial literacy (Siegfried & Wuttke, 2021). The OTL approach aims to examine how learning opportunities in financial education have been available for students through their school education (Schmidt et al., 2014). A previous OECD (2020) report on PISA 2018 showed that along with students from Australia, Indonesia, and the Russian Federation, Finnish adolescents reported the greatest OTL and exposure to financial literacy tasks in school lessons. Indeed, the financial education at schools based on OTL is relevant in the Finnish context because financial literacy is an explicit part of the Finnish national core curriculum. Starting from 2004, Finnish Grade 9 students have had one course on financial literacy as a part of their social science studies (The Finnish National Board of Education, 2004; Vitikka et al., 2012). In addition, financial matters are taught as an integrated part of math in Grades 7–9 and home economics in Grade 7. Our Finnish participants in PISA 2018 were exposed to this curriculum.

Previous research has suggested that financial education at school may positively affect confidence and the performance of financial literacy. For instance, Batty et al. (2015) reported that financial education at school has at least short-term effects on attitudes and spending behavior. Hilgert et al. (2003) argued that financial education provides information and promotes skill-building and motivation. A meta-analysis of 126 studies reported that financial education significantly predicted financial literacy and financial behavior (Kaiser & Menkhoff, 2017). Taken together, previous studies focused on explaining how financial socialization at schools relates to financial literacy (Silinskas, Ahonen, et al., 2021), with only a few exploring the relation to confidence (Hilgert et al., 2003). However, none of them examined how financial socialization relates to financial literacy through confidence in the skills and knowledge about financial matters. Although the OECD (2019) financial literacy framework has theoretically suggested this indirect link, studies have not yet empirically tested it. However, knowing how education at school and OTL relates to students' confidence in using financial services is important and may guide in understanding the mechanisms behind the direct links between the school environment and financial literacy. This study aimed to examine these direct and indirect pathways.

Another source of access to financial information is parental involvement in financial matters at home. Parents play an essential role in their children's financial socialization process through both implicitly and explicitly communicating information on financial matters to their children (Bowen, 2002; Danes & Yang, 2014; Gudmunson & Danes, 2011; Kagotho et al., 2017; Moschis, 1985; Shim et al., 2010; Vosylis & Erentaite, 2020). Implicit socialization occurs through the resources parents make available to their children, observation or imitation of parental behaviors, and unconscious communication of norms and expectations. Some sociodemographic characteristics, such as parental education and family wealth, can also represent

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implicit familial financial socialization. In contrast, explicit financial socialization can occur through direct communication about financial issues and through the conscious creation of opportunities that allow young people to participate in financial practices (Sherraden et al., 2011). Moreno-Herrero et al. (2018) showed that parental involvement in financial matters with a child, in particular the frequency of discussing financial matters, was positively related to students' financial literacy in nine (e.g., Australia, Chile, and Lithuania) out of 15 countries participating in PISA 2015. Thus, this positive link is not always found. Moreover, some studies reported negative links between parental involvement in matters of financial literacy and financial literacy skills (e.g., among Finnish adolescents in PISA 2018; Silinskas, Ahonen, et al., 2021). Interestingly, the latest PISA 2018 assessment showed that parental involvement in financial matters with their children was the lowest in Estonia and Finland (OECD, 2020). Taken together, despite expectations of the PISA financial literacy framework (OECD, 2019) and many previous studies to expect a positive link between parental involvement in financial matters and financial literacy, skills, and knowledge, empirical findings are mixed, indicating different cultures of communication between countries (Moreno-Herrero et al., 2018; Silinskas, Ahonen, et al., 2021). Moreover, previous studies have focused on the associations of family socialization factors with financial literacy skills (Silinskas, Ahonen, et al., 2021). However, this does not explain the mechanisms behind the association of parental involvement with financial literacy (e.g., the role of financial confidence). Again, as suggested by the financial literacy framework (OECD, 2019) and the self-determination theory (Ryan & Deci, 2000, 2020), parental involvement may contribute to their children's financial confidence as the goal in itself, and because of improved financial confidence, adolescents' financial literacy may improve. Despite this plausible explanation, it is surprising that previous PISA studies did not test these effects in the domain of financial literacy. Recognizing the importance of financial confidence, we investigated the associations of financial socialization at home with confidence in using financial services and the indirect links to adolescents' financial literacy skills through confidence in using financial services.

1.3 | The role of socio-demographic factors in financial socialization, financial confidence, and financial literacy

Previous research has shown that socio-demographic background characteristics, such as adolescent gender, age (or grade level), parental education, and family wealth (e.g., family wealth possessions), may be related to the financial socialization factors, adolescents' confidence in using financial services, and financial literacy (Arellano et al., 2018; Cordero et al., 2019; Lusardi & Lopez, 2016). First, previous studies have provided mixed results on how adolescents' gender relates to financial literacy. For instance, in PISA 2012, boys scored higher than girls on the financial literacy assessment in Spain (Arellano et al., 2014) and Estonia (Riitsalu & Põder, 2016) and among all participating countries when analyzed together (Cordero et al., 2019). In 2015 PISA, boys scored higher in four countries and girls scored higher in two countries (out of 15 countries), whereas in half of the countries, the association was not significant (Moreno-Herrero et al., 2018). The most recent PISA 2018 report also suggests a gender difference, favoring boys; however, again, gender differences seem to be dependent on the country (OECD, 2020).

Second, adolescents' age or grade level can be related to financial literacy. For instance, older children scored higher on financial literacy in PISA 2012 (Arellano et al., 2014; Cordero

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et al., 2019). The same tendency was observed in PISA 2015 among four countries (Australia, Belgium, the Netherlands, and Poland) but was not significantly related in the remaining 11 countries (e.g., Canada, Italy, Lithuania, and Spain).

Third, students from families with higher educated parents generally scored higher on financial literacy (Lusardi et al., 2010). Although some studies showed that parental education in terms of dichotomized variables such as "mother is university educated" did not relate to financial literacy (Cordero et al., 2019), other studies reported that dichotomous variables such as "highly educated father" persistently positively related to financial literacy (Arellano et al., 2018). Further, the socio-economic status of adolescents' families explained financial literacy in some countries, such as Australia, Belgium, and the USA (PISA 2015; Moreno-Herrero et al., 2018).

Finally, increased access to financial services is vital (Lusardi & Lopez, 2016). Therefore, adolescents from wealthy families may be exposed to a wider variety of financial resources and opportunities for financial inclusion compared with children from families with low and moderate incomes (Friedline, 2012; Grinstein-Weiss et al., 2011; Moreno-Herrero et al., 2018). Children from wealthier families that use more financial services might also be more competent in financial literacy (Lusardi et al., 2010).

Taken together, previous research on socio-demographic variables mainly focused on their relation to financial literacy. Associations of the socio-demographic variables with financial socialization and financial confidence variables could potentially be interesting but are still of an exploratory nature. In addition, socio-demographic factors need to be taken into account when predicting factors related to financial literacy. In the present study, we mainly used them as control variables to obtain more robust results. However, these socio-demographic factors can also be interesting when illustrating and highlighting the main study results. For instance, the family's highest education and wealth possession may represent implicit parental involvement in financial literacy. Thus, we investigated the direct effects of socio-demographics on all study variables.

1.4 | The present study

The present study aimed to investigate the associations between financial socialization factors and Finnish adolescents' confidence in using financial services in PISA 2018. In addition, we investigated the indirect paths from financial socialization factors to financial literacy through confidence in using financial services and the role of socio-demographic control variables. We examined three research questions:

RQ1: To what extent do the financial socialization factors (financial education in school and parental involvement) predict financial confidence (in using financial and digital financial services)? Based on previous studies, we expected to find that higher exposure to and help with financial matters at school and home would positively predict adolescents' financial confidence.

RQ2: To what extent do financial socialization factors relate to financial literacy via confidence in using digital services? Based on previous research, we expected that adolescents' confidence in using financial services with or without digital devices would positively relate to adolescents' financial literacy (Arellano et al., 2014, 2018). Accordingly, we also expected to find indirect paths from financial socialization to financial literacy via confidence in using financial services (OECD, 2019).

RQ3: To what extent are socio-demographic factors (gender, grade level, highest parental education, and family wealth possessions) associated with financial socialization, confidence in

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using financial services, and financial literacy? Based on previous research, we expected that boys would have higher financial literacy scores than girls, adolescents in higher grades would gain higher financial literacy scores than those in lower grades, children from higher educated families would score higher on financial literacy, and family wealth possessions would be related to higher financial literacy scores (Arellano et al., 2014, 2018; Cordero et al., 2019; Moreno-Herrero et al., 2018). However, owing to the lack of previous research, we did not set expectations for the association of socio-demographic factors with financial socialization and confidence in using financial services.

2 | METHODS

2.1 | Participants and procedure

The participants were 4328 Finnish adolescents taking part in the PISA 2018 financial literacy assessment. The adolescents were randomly selected using stratified sampling. First, participating schools were randomly selected; next, students within sampled schools were randomly selected. The eligible age of PISA students should be between 15 years and 3 months and 16 years and 2 months. In Finland, the assessment was organized in April and May 2018, and the students were born between February 1, 2002, and January 31, 2003. This sample represented a total of 57,500 adolescents from Finland. The modal grade for the age cohort in Finland was Grade 9. Using the ISCED 1997 classification (UNESCO, 2006), the highest education of either of the adolescents' parents was as follows: 0.3% ($n = 11$) were placed in the category "no education," 0.1% ($n = 4$) were categorized as primary education (ISCED 1), 1.3% ($n = 57$) were lower secondary (ISCED 2), 17.7% ($n = 768$) were vocational/pre-vocational upper secondary and non-tertiary post-secondary (ISCED 3A/4), 17.0% ($n = 735$) were vocational tertiary (ISCED 5B), and 61.5% ($n = 2660$) were theoretically oriented tertiary and post-graduate (ISCED 5A/6); for 2.1% ($n = 93$) of the parents, data were missing. Tables 1 and 2 present a detailed description of the sample in terms of gender, grade level, and parental education.

Students solved financial literacy test tasks and answered questionnaires online as part of the PISA test. The cognitive part was a 2-h test, and students answered questionnaires for 50 min after a break. For the cognitive part, students solved a set of financial literacy items from a whole battery of tasks (not all tasks). Following or preceding this, students solved mathematics or reading items for 60 min. They answered three background questionnaires: Student Questionnaire, Financial Literacy Questionnaire, and Information and Communication Technology (ICT) Familiarity Questionnaire.

2.2 | Measures

The PISA 2018 assessment and analytical framework document (OECD, 2019), PISA 2018 Results Report Volume IV (OECD, 2020), and Silinskas, Ahonen, et al. (2021) have described all measures used in the present study. The OECD PISA data repository presents financial literacy test scores in the form of 10 plausible values. Warm's mean weighted likelihood estimate (WLE) scores present all the composite scores of the questionnaires; they have been standardized to have an OECD mean of zero and a standard deviation of one. Table 1 presents the

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TABLE 1 Psychometric properties of study variables.

Variables	*N* (%)	*M*	*SD*	Cronbach's *α*	Min	Max
Financial literacy (plausible values 1–10)	4328	536.855	101.913			
Financial socialization factors						
Financial education in school lessons (WLE)	4050	0.474	0.896	0.883	−1.56	2.32
Parental involvement in matters of financial literacy (WLE)	4027	−0.151	0.870	0.819	−1.99	2.40
Confidence in using financial services factors						
Confidence in using financial services (WLE)	3882	−0.001	0.915	0.896	−2.184	2.315
Confidence in using digital financial services (WLE)	3820	0.035	0.925	0.873	−2.159	2.078
Control variables						
Gender	4328					
• female	2129 (49.2%)					
• male	2199 (50.8%)					
Student international grade	4328	8.860	0.357		7	10
• Grade 7	21 (0.5%)					
• Grade 8	546 (12.6%)					
• Grade 9	3760 (86.9%)					
• Grade 10	1 (0.02%)					
Highest education of parents	4233	5.370	0.969			
Family wealth (WLE)	4272	0.216	0.743	0.552	−4.65	4.14

Note: Warm's mean weighted likelihood estimates (WLEs) are computed for the PISA indices used in our study. These values are drawn from the PISA data repository. The WLE values are standardized across OECD countries and have a mean of zero and a standard deviation of one.

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TABLE 2 Means and standard deviations of financial literacy, socialization, and confidence by gender, grade, and parental education.

	Gender *M* (*SD*)		Grade *M* (*SD*)			Highest parental education *M* (*SD*)			
	Girls	Boys	Grade 7	Grade 8	Grade 9	ISCED 2	ISCED 3A/4	ISCED 5B	ISCED 5A/6
Financial literacy (plausible values 1–10)	540 (94.9)	537 (107)	392 (78.6)	482 (103)	546 (98.4)	464 (98.6)	510 (95.2)	522 (95.0)	554 (101)
Financial education in school lessons	0.469 (0.875)	0.504 (0.910)	−0.675 (0.689)	−0.077 (0.904)	0.562 (0.862)	0.457 (0.995)	0.403 (0.930)	0.486 (0.877)	0.494 (0.889)
Parental involvement in matters of financial literacy	−0.112 (0.808)	−0.183 (0.923)	−1.172 (0.992)	−0.209 (0.872)	−0.135 (0.864)	0.057 (975)	−0.291 (0.900)	−0.128 (0.896)	−0.119 (0.847)
Confidence in using financial services	−0.213 (0.849)	0.220 (0.919)	−0.622 (1.010)	−0.213 (0.943)	0.031 (0.901)	0.085 (0.995)	−0.092 (0.905)	0.004 (0.886)	0.024 (0.914)
Confidence in using digital financial services	−0.117 (0.885)	0.198 (0.922)	−0.680 (1.029)	−0.195 (0.972)	0.072 (0.903)	0.122 (1.00)	−0.084 (0.959)	0.020 (0.924)	0.075 (0.906)

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psychometric properties of all questionnaire variables (including sample size, mean, standard deviation, minimum and maximum values, and Cronbach's α).

2.2.1 | Students' tests

Financial literacy

PISA 2018 used 43 cognitive test items to measure financial literacy, but students solved only some of the tasks (not all tasks). Of the items, 29 were non-interactive items developed for the 2012 and 2015 PISA. A total of 14 additional items were created for the 2018 assessment. These items included interactive elements so that they would add to the sense of reality and maintain the interest of students. PISA 2018 included items in various formats to minimize the possibility that item format would have an influence on adolescent performance. Depending on the task, the adolescents provided short descriptive responses, more direct responses of one or two sentences, or a calculation, or they checked a box. Most of the items were dichotomously coded (correct or incorrect), whereas for some items, the scoring was more nuanced, and a partial credit was awarded. The final score for the PISA 2018 financial literacy assessment was provided in the form of 10 plausible values for each student. Technically, plausible values are random draws from the estimated ability distribution of the proficiency of every student (Mislevy et al., 1992; Wu, 2005). These plausible values can be interpreted as the range of abilities that a student might reasonably have (Wu, 2005). All 10 plausible values need to be taken into account when performing analyses to avoid problems associated with bias and inefficiency. To control for these properties, PISA 2018 data sets provide 80 replicates of individual weightings, which allow efficient estimations.

2.2.2 | Students' questionnaire

Financial education in school lessons

The students were asked about the frequency of specific finance-related activities in relation to financial matters at school: How often have you encountered the following types of tasks or activities in a school lesson in the last 12 months? Adolescents were presented with the six items (describing the purpose and uses of money; exploring the difference between spending money on needs and wants; exploring ways of planning to pay an expense; discussing the rights of consumers when dealing with financial institutions; discussing the ways in which money invested in the stock market changes value over time; and analyzing advertisements to understand how they encourage people to buy things). The response categories ranged from "Never" and "Sometimes" to "Often." Cronbach's alpha was 0.883.

Parental involvement in matters of financial literacy

This was measured by asking about the frequency of collaboration with parents in financial matters: How often do you discuss the following matters with your parents (or guardians or relatives)? Adolescents were presented with four items (your spending decisions; your savings decisions; the family budget; and money for things you want to buy). The response categories ranged from "Never or hardly ever," "Once or twice a month," and "Once or twice a week" to "Almost every day." Cronbach's alpha was 0.819.

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Confidence in using financial services

The students were asked: How confident would you feel about doing the following things? They rated six items (making a money transfer, such as paying a bill; filling in forms at the bank; understanding bank statements; understanding a sales contract; keeping track of my account balance; and planning my spending with consideration of my current financial situation), each of which was evaluated on a four-point Likert scale ranging from "Not at all confident," "Not very confident," and "Confident" to "Very confident." Cronbach's alpha was 0.896.

Confidence in using digital financial services

The questions included: When using digital or electronic devices outside of the bank (e.g., at home or in shops), how confident would you feel about doing the following things? They rated five items (transferring money; keeping track of my balance; paying with a debit card instead of using cash; paying with a mobile device, such as mobile phone or tablet, instead of using cash; and ensuring the safety of sensitive information when making an electronic payment or using online banking), each of which was evaluated on a four-point Likert scale ranging from "Not at all confident," "Not very confident," and "Confident" to "Very confident." Cronbach's alpha was 0.873.

Socio-demographic factors (gender, student international grade [Grade], and the highest educational level of parents) have been presented when describing the sample and in Table 1.

Family wealth possessions

To measure family wealth possessions, two questions were asked. One of the questions (Which of the following are in your home?) had four items (a room of your own; a link to the Internet; a laptop; and an alarm system) and was to be answered in "Yes" or "No." Another question (How many of these are there at your home?) had seven items (e.g., televisions, cars, and rooms with a bath or shower) with response categories of "None," "One," "Two," and "Three or more."

2.3 | Analysis strategy

When analyzing PISA data, one needs to take into account the 10 plausible values of financial literacy scores and the 80 specific weights. Therefore, for the preliminary analyses—descriptives (Tables 1 and 2) and correlations (Table 3)—of the Finnish data, we used an IEA IDB Analyzer (a macro of SPSS 24.0) specifically designed for analyzing large-scale assessment data of PISA. These analyses used sample weights, and correlations with financial literacy were average estimates over plausible values.

To answer our research questions, we built the path model as follows. First, we constructed our main model that allowed financial socialization factors (lessons at school and parental involvement) to correlate. We specified these factors to predict both variables of confidence in using financial services (using and not using digital devices). Furthermore, we specified both variables of confidence in financial matters to correlate and predict financial literacy. We estimated the indirect effects of financial socialization factors on financial literacy via both confidence variables. Second, our analyses included a set of socio-demographic control variables (adolescent gender, grade level, highest parental education, and family wealth) to predict all study variables: financial socialization, confidence in using financial services, and financial literacy. This was our final model.

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TABLE 3 Correlations between all study variables.

		1	2	3	4	5	6	7	8
1	Financial literacy[a]								
2	Financial education in school lessons	0.17***							
3	Parental involvement in matters of financial literacy	0.01	0.28***						
4	Confidence in using financial services	0.13***	0.22***	0.21***					
5	Confidence in using digital financial services	0.18***	0.21***	0.20***	0.71***				
6	Gender (1 female, 2 male)	−0.03	0.02	−0.04**	0.24***	0.17***			
7	Grade	0.23***	0.25***	0.05**	0.09***	0.10***	−0.04**		
8	Highest education of parents	0.20***	0.03	0.04**	0.04*	0.06***	−0.01	0.07***	
9	Family wealth possessions	0.03	0.05**	0.08***	0.11***	0.13***	0.06***	0.04*	0.15***

[a]Correlations with financial literacy were averaged estimates over plausible values.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

We constructed path models using the Mplus statistical package (version 8.8; Muthén & Muthén, 1998–2017) and applied the standard procedure implemented in the Mplus statistical package. That is, in the path analyses, we treated all study variables as continuous. We did not alter this default specification because none of the study variables were nominal with more than two groups, and all three dependent variables were continuous. To analyze the data, we used the general sample weight and 80 replicate weights by employing Mplus analysis command REPSE = FAY (0.05).

The proportion of missing data for the main study variables ranged from 0% to 11.7% ($M = 2.16\%$, $SD = 3.88\%$). The data were not missing completely at random (MCAR): Little's (1988) MCAR test was significant: χ^2 (239) = 637.935, $p < 0.001$. Therefore, we assumed that the data were missing-at-random (MAR, not MCAR) and applied the standard procedure of full-information maximum-likelihood (FIML). FIML estimates a likelihood function for each individual person based on all the available data and without imputing data (Collins et al., 2001). We estimated the model parameters using the ML (maximum likelihood) estimator, which is implemented in Mplus and provides less biased estimates than, for example, listwise deletion (Enders, 2001). Mplus does not do imputations but handles missing data using ML under MAR.

We used the analysis type COMPLEX. This analysis method takes students' nesting within schools into account but estimates the model at the individual (within) level. Although in the presence of nested data both COMPLEX and multilevel modeling approaches are appropriate, we chose COMPLEX because we were interested in the individual student level. Clustering was based on the adolescents' school membership.

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Chi-square statistics are not available when estimating models with replicate weights. Standardized root mean square residual (SRMR) is the only scalable model fit index printed in Mplus outputs when using replicate weights. SRMR values below 0.08 indicate a good model fit, values below 0.10 indicate an adequate/acceptable fit, and values above 0.10 indicate a poor model fit (Hu & Bentler, 1999). We interpreted effect sizes as follows: correlation $r = 0.10$, 0.30, and 0.50 indicate small, medium, and large, respectively; similarly, $R^2 = 2\%$, 13%, and 26% indicate small, medium, and large, respectively (Cohen, 1988).

3 | RESULTS

3.1 | Path analysis

Table 3 presents zero-order correlations on the Finnish data. Our first model, in which we set the financial socialization factors to indirectly predict financial literacy scores via confidence in using financial services variables, had a good model fit (SRMR = 0.004). Our second model, in which we added and specified four socio-demographic variables (gender, grade, parental education, and family wealth) to predict all main study variables, also showed a good model fit (SRMR = 0.016). The addition of demographics did not change the results of the main study variables. Thus, we considered our second model as the final model. Figure 1 presents the main results of the final model, and Table 4 presents all results, including demographics.

To answer the first research question, financial education in school lessons positively predicted confidence in using financial services ($\beta = 0.155$, $p < 0.001$) and confidence in using digital financial services ($\beta = 0.146$, $p < 0.001$). Further, parental involvement in matters of financial literacy positively predicted confidence in using financial services ($\beta = 0.169$, $p < 0.001$) and confidence in using digital financial services ($\beta = 0.154$, $p < 0.001$).

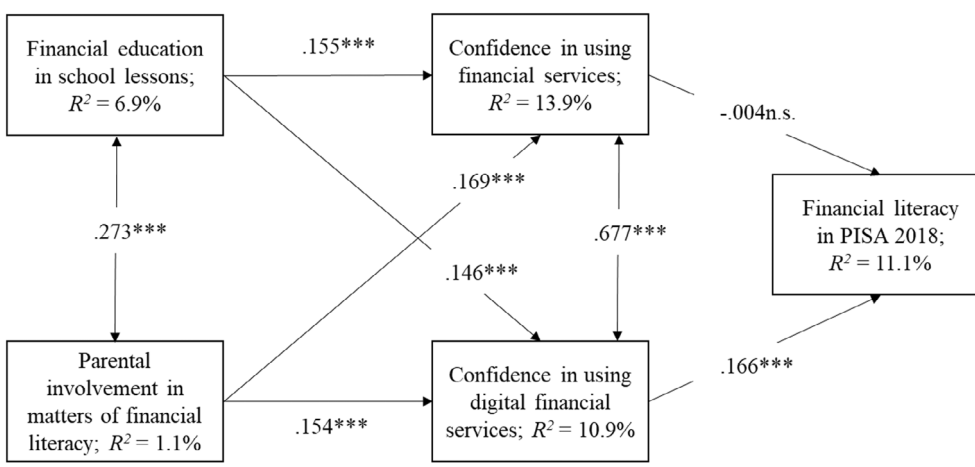

FIGURE 1 School and family environments predicting adolescents' confidence in using financial services after controlling for socio-demographic background characteristics. Standardized solution. *** $p < 0.001$ and $^{n.s.}$ $p > 0.05$.

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TABLE 4 All paths and correlations of the final model (complementary to Figure 1) ($n = 4227$).

			Standardized estimate	Standard error	*p*-value
Paths predicting financial literacy ($R^2 = 11.1\%$)					
Confidence in using financial services	→	Financial literacy	−0.004	0.029	0.288
Confidence in using digital financial services	→	Financial literacy	0.166	0.029	**<0.001**
Gender (1 female, 2 male)	→	Financial literacy	−0.036	0.021	0.082
Grade	→	Financial literacy	0.198	0.020	**<0.001**
Parental education	→	Financial literacy	0.179	0.017	**<0.001**
Wealth possessions	→	Financial literacy	−0.029	0.017	0.094
Paths predicting confidence in using financial services ($R^2 = 13.9\%$)					
Financial education in school lessons	→	Confidence in using financial services	0.155	0.024	**<0.001**
Parental involvement in financial matters	→	Confidence in using financial services	0.169	0.023	**<0.001**
Gender (1 female, 2 male)	→	Confidence in using financial services	0.239	0.015	**<0.001**
Grade	→	Confidence in using financial services	0.055	0.019	**0.004**
Parental education	→	Confidence in using financial services	0.009	0.017	0.579
Wealth possessions	→	Confidence in using financial services	0.060	0.016	**<0.001**
Paths predicting confidence in using digital financial services ($R^2 = 10.9\%$)					
Financial education in school lessons	→	Confidence in using digital financial services	0.146	0.023	**<0.001**
Parental involvement in financial matters	→	Confidence in using digital financial services	0.154	0.023	**<0.001**
Gender (1 female, 2 male)	→	Confidence in using digital financial services	0.166	0.017	**<0.001**
Grade	→	Confidence in using digital financial services	0.065	0.020	**0.001**
Parental education	→	Confidence in using digital financial services	0.023	0.015	0.135
Wealth possessions	→	Confidence in using digital financial services	0.089	0.017	**<0.001**
Paths predicting financial education in school lessons ($R^2 = 6.9\%$)					
Gender (1 female, 2 male)	→	Financial education in school lessons	0.030	0.017	0.072
Grade	→	Financial education in school lessons	0.257	0.018	**<0.001**

(Continues)

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TABLE 4 (Continued)

			Standardized estimate	Standard error	*p*-value
Parental education	→	Financial education in school lessons	0.005	0.016	0.753
Wealth possessions	→	Financial education in school lessons	0.033	0.017	0.055
Paths predicting parental involvement in financial matters ($R^2 = 1.1\%$)					
Gender (1 female, 2 male)	→	Parental involvement in financial matters	−0.043	0.016	**0.006**
Grade	→	Parental involvement in financial matters	0.047	0.018	**0.008**
Parental education	→	Parental involvement in financial matters	0.027	0.020	0.172
Wealth possessions	→	Parental involvement in financial matters	0.075	0.019	**<0.001**
Correlations					
Confidence about financial matters	↔	Confidence in using digital financial services	0.677	0.011	**<0.001**
Financial education in school lessons	↔	Parental involvement in matters of financial literacy	0.273	0.017	**<0.001**

Note: In **bold**—significant paths at $p < 0.05$ level.

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To answer the second research question, interestingly, confidence in using financial services was not related to financial literacy ($\beta = -0.004$, $p = 0.288$), but confidence in using digital financial services was significantly positively related to financial literacy ($\beta = 0.166$, $p < 0.001$). Consequently, indirect pathways from financial socialization (financial education in school lessons and parental involvement) to financial literacy went only through the variable of confidence in using digital financial services ($\beta = 0.033$, $p < 0.001$ and $\beta = 0.029$, $p < 0.001$ for schools and families, respectively).

To answer the third research question, the four socio-demographic control variables differentially predicted all main study variables. Financial education in school lessons was related to adolescents' grade level ($\beta = 0.257$, $p < 0.001$): A higher grade level was related to higher frequency of financial topics being discussed in class. Parental involvement in matters of financial literacy was related to adolescent gender ($\beta = -0.043$, $p = 0.006$), grade level ($\beta = 0.047$, $p = 0.008$), and family wealth ($\beta = 0.075$, $p < 0.001$), suggesting that girls, older adolescents, and adolescents from wealthier families discuss financial matters with their parents more often than other adolescents. Confidence in using financial and digital financial services were both predicted by gender ($\beta = 0.239$, $p < 0.001$ and $\beta = 0.166$, $p < 0.001$, respectively), grade level ($\beta = 0.055$, $p = 0.004$ and $\beta = 0.065$, $p = 0.001$, respectively), and family wealth ($\beta = 0.060$, $p < 0.001$ and $\beta = 0.089$, $p < 0.001$, respectively). This suggests that boys, students of higher grades, and adolescents living in wealthier families are more confident in using financial services than other adolescents. Finally, out of all the socio-demographic variables, only grade level ($\beta = 0.198$, $p < 0.001$) and parental education ($\beta = 0.179$, $p < 0.001$) were related to financial literacy: Students in higher grades and those living in families with higher educated parents were more likely to develop better financial literacy skills. In terms of effect sizes, the final model explained 11.1% of financial literacy (medium effect), 13.9% of confidence in using financial services (medium effect), 10.9% of confidence in using digital financial services (medium effect), 6.9% of financial education in school lessons (small to medium effect), and 1.1% of parental involvement (small effect). The effect sizes for individual significant paths can be qualified as representing small effects (0.146–0.169 in Figure 1).

3.2 | Robustness checks

To test the robustness of our findings, we performed two different specification checks to observe the changes/validity of our findings when additional variables are added, when between (school) level is modeled, and when some assumptions behind the final model are relaxed. First, we added a few adolescent psychological/motivational variables (competitiveness, task orientation, metacognition) to the within (individual) level to predict all of the study variables presented in Figure 1. The results of the final model remained similar to the ones previously reported. Second, we modeled the associations depicted in Figure 1 on the between (school) level. For Mplus to run this model, we disabled the REPSE option that uses 80 replicate weights, but we still used school clustering and general weight. On the between level, none of the modeled associations were significant, but the previously reported individual level results did not change. These analyses confirmed the robustness of our previously reported results.

4 | DISCUSSION

The current study investigated the associations between financial socialization and adolescents' confidence in using financial services as well as their indirect effects on financial literacy among

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Finnish adolescents taking part in PISA 2018. Overall, the study emphasizes the importance of financial socialization at schools and in families on adolescents' confidence in using financial services. The study also helps to explain the high achievement of Finnish students by revealing the influences of formal education and parental socialization through adolescents' financial confidence in using digital financial services. In addition, socio-demographic variables—adolescent gender, grade level, parental education, and family wealth—complemented the broader picture by offering additional explanations for the associations found between adolescents' financial socialization, financial confidence, and financial literacy skills.

4.1 | Financial socialization and confidence in using financial services

To answer our first research question, in line with the OTL approach (Rudeloff et al., 2019; Schmidt et al., 2014, 2015; Schmidt & McKnight, 1995) and previous findings (e.g., PISA 2012 by Cordero et al., 2019), we found a positive association between financial education through school lessons and confidence in using both financial and digital financial services. According to the Finnish national core curriculum (The Finnish National Board of Education, 2004; Vitikka et al., 2012), financial education starts in Grade 9, and some topics are introduced in Grade 7 as a part of math and home economics. Some of our participants were still attending Grades 7 and 8 and therefore were not yet explicitly exposed to the course on financial literacy. Given this information, it is not surprising that participants who have encountered more financial tasks and activities during lessons at schools in the last 12 months also reported being more confident in using financial services. In contrast, those adolescents who reported having been exposed to fewer tasks and activities (or being in lower grades) rated their confidence in using financial services lower. Here, one socio-demographic variable becomes relevant—namely, children's grade level. Its positive relation to financial education in school lessons provides further empirical support that students in higher grades have participated in financial literacy–related school instruction more than those in lower grades. Interestingly, the direct relation of the grade level to confidence in using financial services is weaker than its relation to financial education in school lessons. This suggests that not only school grade level but also the tasks, activities, and topics discussed in the lessons are important for adolescents' confidence in using financial services. Moreover, research has shown that schools and teachers may adopt different strategies for teaching financial literacy (Cordero et al., 2019). Some financial literacy programs/lessons can expose adolescents to basic concepts, but others may present well-developed frameworks/lessons. In Finland, a cross-curricular approach is applied, as financial education can be flexibly integrated into the curriculum as a part of math, humanities, or social sciences. Further, teachers often have the freedom to decide whether to include aspects of financial literacy within their subjects. In addition to the compulsory courses of the national core curriculum, these aspects of financial education highlight a large variation in financial literacy exposure across schools and classrooms (Atkinson & Messy, 2013; Cordero et al., 2019; Grifoni & Messy, 2012). Financial education courses are not compulsory in many countries (e.g., only 3% of schools in Spain based on PISA 2012; Cordero et al., 2019), whereas Finland was among the countries with the highest frequency of financial education at schools (PISA 2018; OECD, 2020). To conclude, empirical findings from PISA 2012 (Cordero et al., 2019) confirm that the availability and opportunity to learn financial skills at school is the key aspect that

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relates to students' higher financial confidence; thus, financial education at schools needs to be implemented in the future curriculum.

Second, as a part of the first research question, we investigated the associations between parental involvement and adolescents' financial confidence. We found that parental involvement in matters of financial literacy was related to their children's confidence in using financial services both with and without digital devices. Parents clearly play an essential role in the financial socialization of their children, both implicitly and explicitly (Bowen, 2002; Danes & Yang, 2014; Gudmunson & Danes, 2011; Moreno-Herrero et al., 2018; Sherraden et al., 2011; Vosylis & Erentaite, 2020). In the present study, we measured some aspects of parental explicit financial socialization that occurred through direct communication about financial issues—in particular, the frequency of discussion of financial matters, such as spending and saving decisions, family budget, and money for purchases. Unsurprisingly, a higher frequency of such explicit discussion of financial matters in families may satisfy adolescents' feeling of relatedness with their family members and a feeling of competence in using financial services (Ryan & Deci, 2000, 2020). Consequently, adolescents' confidence in using financial services increases when applying financial knowledge in practice, both when using traditional financial services and digital financial services. In addition to explicit financial socialization, in the present study, we indirectly measured parental implicit financial socialization. That is, parental education and family wealth can be considered implicit factors of parental socialization, as children can model their financial behavior by observing their parents setting an implicit example for them (Bowen, 2002; Danes & Yang, 2014; Gudmunson & Danes, 2011; Kagotho et al., 2017; Moschis, 1985; Shim et al., 2010; Vosylis & Erentaite, 2020). Interestingly, parental education and family wealth are differentially related to our main study variables: Children in families with higher educated parents are more likely to score higher on actual skills and knowledge related to financial literacy, whereas children from wealthier families tend to discuss financial matters with their parents and have stronger confidence in using both traditional and digital financial services. In addition, in PISA 2018, Finnish adolescents were the most experienced in financial services among all participating countries: Almost 90% of adolescents reported holding an account at a bank, around 75% held a payment or debit card, and around 80% had made an online purchase (OECD, 2020). Thus, this relative independence and autonomy of Finnish adolescents possibly relates to their confidence in using financial services.

4.2 | Indirect paths from financial socialization to financial literacy skills through confidence in using financial services

Our second research question asked whether confidence in using financial services can directly predict financial literacy and accordingly whether confidence in using financial services can mediate the indirect path between financial socialization and financial literacy. In line with previous theories of financial socialization (Danes & Yang, 2014; Gudmunson & Danes, 2011) and previous studies (Arellano et al., 2014, 2018), we found that adolescents' financial confidence was related to their higher scores in financial literacy. However, in contrast to previous research, our study took one step further and used data about confidence in using financial services; that is, our measure was financial literacy–specific. As another advancement from previous research, we analyzed two types of confidence in using financial services: (1) confidence in using financial services in general when managing traditional everyday financial matters (such as paying bills, making money transfers, understanding bank statements and contracts,

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planning spending, and tracking account balance) and (2) confidence in using digital financial services. Our results showed that confidence in using financial services in general was correlated with financial literacy (zero-order correlation = 0.13, $p < 0.001$), but it lost its significance after we simultaneously considered other factors in one model. In contrast, confidence in using digital financial services was significant both in zero-order correlations and in the path model. This is an interesting and novel result, which reflects the reality of the fast digitalization processes of financial services. Young consumers in Finland may use digital financial services relatively often because this fast and convenient way of dealing with financial matters (e.g., net banking, paying by cards instead of cash, and confirming financial services using mobile phones) is widely encouraged and increasingly becoming the only way of dealing with such matters. However, as mentioned earlier, this rapid digitalization of available financial services raises a number of risks that adolescents need to face and deal with. Thus, early financial education, and especially one focusing on the management of finance using digital devices, is important now and in the future.

Another important finding of our study is the existence of two indirect paths from financial socialization (at school and in families) to financial literacy skills/scores via confidence in using digital financial services. First, apart from the direct positive effect of financial education at school on financial literacy skills (Silinskas, Ahonen, et al., 2021), one possible indirect path between the two goes through confidence in using digital financial services. Second, although the direct associations of parental involvement in matters of financial literacy with financial literacy scores can be nonsignificant or even negative (Silinskas, Ahonen, et al., 2021), we found that adolescents' confidence in using digital financial services can be one mediator that explains the mechanism behind the positive link between parental involvement and adolescents' financial literacy scores. Although we concurrently measured all constructs, controlling for a number of socio-demographic factors has helped to achieve robust results. Moreover, the obtained results are consistent with previous theories, suggesting that financial socialization first relates to adolescents' motivation (e.g., confidence); then, positive outcomes (e.g., performance) occur. To this end, our results comply with the theoretical framework of financial literacy in PISA 2018 (OECD, 2019), confirming that financial education at school and discussion of financial matters in families may result in higher adolescents' confidence in using financial services, which becomes instrumental in building financial skills and knowledge. In addition, as posited by the self-determination theory (Ryan & Deci, 2000, 2020), school and home activities and discussions that promote intrinsic motivation (e.g., the satisfaction of basic psychological needs of autonomy, relatedness, and—especially in our case—competence) may promote adolescents' behavior of deepening their financial knowledge and engaging in activities and the use of financial services, thus leading to higher performance gains (i.e., higher financial literacy scores on the PISA).

4.3 | The role of socio-demographic factors on financial socialization, confidence in using financial services, and financial literacy

To answer our third research question, we found various ways in which socio-demographic factors complement our main results. First, concerning the effect of gender, girls more frequently discussed financial matters with their parents than boys, whereas boys were more confident in using financial services (both using and not using digital devices). Gender did not have a direct effect on financial literacy scores or financial education in school lessons. In PISA 2018, among

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eight countries, financial literacy scores showed no gender differences (e.g., Canada, Chile, and Lithuania), whereas boys scored higher than girls in five countries (e.g., Australia, China, and Italy), and girls scored higher in Poland and the Slovak Republic. These findings align with the suggestion that gender differences are less apparent in the financial literacy scores, whereas they are more prominent in motivational characteristics—confidence, in particular—as girls are less confident in financial literacy (Arellano et al., 2018; Bucher-Koenen et al., 2017).

Second, higher grade level was related to the higher frequency of financial education at school. As discussed above, this is not surprising because students in higher grades in our sample attend financial literacy lessons as part of the Finnish national core curriculum. In accordance with some previous results (Riitsalu & Põder, 2016), our results showed that students in higher grades (mostly students from Grade 9) had better financial literacy skills than students in lower grades (e.g., Grades 7 and 8). In our study, we looked at adolescents' grade level (not age), which provides a better explanation for why this would be the case. This is in accordance with the findings of PISA 2015 (Moreno-Herrero et al., 2018), showing that in four (i.e., Australia, Belgium, the Netherlands, and Poland) out of 15 countries, children's age was positively related to better financial literacy scores, whereas for the other countries, the associations were not significant. Given that students in Grade 9 are taught financial literacy at school and that Finland is among the countries with the largest amount of lessons in financial literacy among PISA 2018 participating countries (OECD, 2020), it is not surprising that we found significant results for older students (i.e., students in higher grades).

Third, interestingly, the highest parental education in the family predicted only financial literacy but neither confidence in using financial services nor financial socialization at school or home. Finally, family wealth positively predicted more frequent parental involvement in financial literacy matters. It also predicted confidence in using financial and digital financial services but not financial literacy scores. The results in the relation to financial literacy scores are in accordance with previous results, which show that in 12 of the 15 countries participating in PISA 2018 (e.g., Canada, Italy, Lithuania, the Netherlands, and Spain), socio-economic status (a combination of parental education, highest parental occupation, and home possessions) was not related to performance in financial literacy (Moreno-Herrero et al., 2018). However, in the present study, we divided socio-economic status into parental education and wealth possessions for a more straightforward interpretation of previous findings. Indeed, this separation clarified the associations, showing that adolescents from wealthier families get more parental involvement concerning financial literacy and have higher confidence in using financial services but that parental education (not wealth possessions) is the important predictor of financial literacy scores among adolescents.

4.4 | Limitations

We present some limitations that must be acknowledged before any generalizations are made based on our results. First, we used cross-sectional (concurrent) data, as is the case with all PISA assessments. Thus, the reported relations are correlational in nature but do not imply a causal effect, and the direction of predictions is tentative at best. For instance, confidence can improve skills, but a lack of confidence can be a result of a lack of skills (Morris et al., 2022). However, some assumptions about the antecedents and consequences are stronger than others. For instance, financial socialization in schools and families arguably occurred for some time before the actual financial literacy skills were measured in PISA 2018. Furthermore, to obtain more robust results, we cotrolled our main results for some socio-demographic factors. Second,

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the cross-sectional nature of the study may expose its results to the third variable problem—that is, the confounding variables that were not taken into consideration might have an effect on the associations we found. Previous studies have suggested a number of confounders on country (expenditure on education, teacher salary, hours of instructional time per year), school (availability of extracurricular activities, positive school climate), and individual level (time spent for learning, use of learning strategies) (Agasisti & Longobardi, 2014, 2017; Agasisti & Zoido, 2018). To address this issue, we conducted few post-hoc robustness tests with additional controls and modeling at a between (school) level. In the robustness analyses, we obtained similar results to the ones reported.

Third, in our path analyses, we did not include the interaction effects between the main study variables or their interactions with controls. Fourth, some of our variables had low reliabilities (e.g., family wealth). This is a known fact in PISA research, and the given variable is often used in combination with other variables (e.g., occupational status and highest education in the family). Rutkowski and Rutkowski (2013) specifically studied this issue and suggested the use of these scales with caution, especially in international comparisons. However, we use this in the Finnish national context and decided to use the family wealth variable on its own because it showed some meaningful results and acted as a control variable for obtaining robust results.

Fifth, whereas we assessed financial literacy by objective tests, we used self-reported questionnaires to assess the other questions. This may expose the results to social desirability and common method biases. Although questionnaires for parents and teachers have been developed and are available to use in parallel with adolescents' tests and questionnaires, PISA 2018 Finland did not collect data from parents and teachers.

Finally, the data came from Finland, a Nordic welfare state that scored high in the latest PISA assessment on financial literacy, and Finland has often scored near the top in other subjects (e.g., reading, math, and science) across many PISA assessments throughout the years (e.g., 2012 and 2015). Thus, the associations reported here can describe a certain cultural and educational environment and should be generalized to other countries with caution.

4.5 | Conclusions and practical implications

Our results suggest some recommendations that can be used to support financial competence among adolescents. First, financial education at schools needs to be encouraged to develop children's financial confidence and skills. As shown in our study, financial education at school increases students' confidence in using financial services; in particular, confidence in using digital financial services increases financial literacy performance. This is important because financial literacy is known to benefit individuals and households, as individuals can make better and more informed decisions (Silinskas, Ranta, et al., 2021; Wilska et al., 2023); moreover, policymakers increasingly perceive the development of financial skills among young people as essential (Moreno-Herrero et al., 2018). Interestingly, as our results show, financial education is more accessible to students in higher grades than those in lower grades. Given that younger students are increasingly being targeted by financial service providers, financial literacy can be introduced to younger students.

Similarly to financial education at schools, parental financial socialization in families provides an important pathway to increasing adolescents' confidence in using financial services and, in turn, obtaining higher gains in financial literacy. Following this result, parents could be advised to more frequently discuss financial matters with their children. However, the interaction needs to be tailored to the adolescents' basic psychological needs and needs to focus on

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promoting their motivation (i.e., confidence) in financial matters (Ryan & Deci, 2000, 2020; Silinskas & Kikas, 2019). That is, parents should be encouraged to not make financial decisions for their children because, despite their best intentions, parental involvement may diminish children's independence in financial decision making and thus hamper the development of their financial literacy. Given our results that parents tend to discuss financial matters with their daughters (vs. sons), with older children, and when they themselves have accumulated more wealth, a recommendation could be to promote parental involvement concerning finances among parents of boys, among parents of students in lower grades, and in less wealthy families. The communication between parents and children on financial matters should also be positive and encouraging rather than punitive and restrictive.

Early financial socialization is especially relevant nowadays, as digital financial services and products carry new risks (e.g., addictive online shopping, issues related to security and privacy, targeted marketing, and quick access to credit products). Lack of financial experience makes adolescents easy targets for deliberate scams; therefore, early financial education in schools and homes can help manage online and digital financial information. Overall, adolescents need to be empowered with age-appropriate information and support to develop their digital and financial confidence and skills, as having the confidence and skills will help them make better financial decisions now and in the future.

FUNDING INFORMATION

Academy of Finland, Strategic Research Council (SRC), Numbers: #327237 and #327242. Academy of Finland, Academy Research Fellow, Numbers: #331525, #336148, and #296082.

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How to cite this article: Silinskas, G., Ahonen, A. K., & Wilska, T.-A. (2023). School and family environments promote adolescents' financial confidence: Indirect paths to financial literacy skills in Finnish PISA 2018. *Journal of Consumer Affairs*, *57*(1), 593–618. https://doi.org/10.1111/joca.12513

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