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Sustainable finance literacy predicts investment behavior beyond general financial literacy: Evidence from two representative samples

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ABSTRACT

Sustainable finance literacy (SFL) is emerging as an essential complement to traditional financial literacy, crucial for enhancing sustainable investments that play a key role in addressing climate change and enabling individuals to avoid greenwashed products. Using two large-scale, preregistered studies with representative Austrian samples (prestudy: $N = 1047$; main experiment: $N = 1510$), we develop a comprehensive inventory to measure SFL and examine its associations with investment behavior. We use a preparatory study to develop and validate the SFL inventory, which is then applied in an incentivized framed field experiment and in self-reported investment measures. Higher SFL is associated with an 18.7-percentage-point increase in stock market investment, a 25.1-percentage-point increase in sustainable investments, and a 13.4-percentage-point decrease in allocations to potentially greenwashed assets as well as an improved ability to identify such products. Furthermore, SFL adds explanatory power beyond general financial literacy for both experienced investors and non-investors. Our findings underscore the relevance of SFL for current discussions on financial education and policy measures aimed at supporting sustainable finance and protecting investors from deceptive sustainability claims.

1. Introduction

Financial literacy is crucial for sound financial decisions. A large body of research highlights the importance of both basic financial literacy (understanding of fundamental financial and economic principles) and advanced financial literacy (understanding of financial markets) for

financial decision-making and stock market participation (Almenberg and Dreber, 2015; Lusardi and Mitchell, 2014; Van Rooij et al., 2011). Recently, sustainable investments that integrate Environmental, Social, and Governance (ESG) dimensions have gained substantial relevance. They play a central role in achieving the United Nations' Sustainable Development Goals, the European Green Deal, and the Paris Agreement,

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and in addressing the climate crisis (Bauer et al., 2021; Eurosif, 2018; Hartzmark and Sussman, 2019; UNDP, 2023; UNFCCC, 2018). From an investor's perspective, however, incorporating ESG considerations adds a new layer of complexity and may require additional domain-specific knowledge or literacy (Filippini et al., 2026, 2024; Löfgren and Nordblom, 2024; Pedersen et al., 2021). This raises a crucial question: Is sustainable finance literacy (SFL) captured by existing financial literacy measures, or are complementary measures required?

We define SFL as domain-specific, investment-relevant knowledge related to sustainable finance. SFL comprises knowledge of core concepts and terminology, relevant regulatory and disclosure frameworks, sustainable financial products, investment strategies, and empirically grounded claims relevant for sustainable investment decisions (e.g., potential impact on ESG targets and the economy). While the canonical basic and advanced financial literacy inventories by Lusardi and Mitchell (2008) and Van Rooij et al. (2011), respectively, exist and are widely used, they do not cover the specific knowledge required to navigate sustainable finance. Among the available definitions and measures of SFL (Auzepy et al., 2026; Degryse et al., 2023; Strauß et al., 2023; Yucel et al., 2023), only a few were developed using a stringent scientific measurement approach (except Filippini et al., 2026, 2024 that we discuss later). Consequently, there are few empirical studies on SFL, and the theoretical and practical relevance of SFL as a complement to general financial literacy remains unclear.

Important gaps also remain regarding how SFL relates to broader financial behavior. While prior research has examined SFL's link to sustainable investment behavior, little is known about its role in the ability to detect greenwashed investments and its relation to stock market participation more generally. Existing work suggests that higher SFL is often linked to greater sustainable investing because it lowers informational barriers (Filippini et al., 2024; Gutsche et al., 2023; Wins and Zwergel, 2016), reduces misperceptions (Meunier and Ohadi, 2022) and perceived information costs, which are central factors in investment behavior (Balloch et al., 2015; Campbell, 2006; Meunier and Ohadi, 2022). A lack of SFL can impair the translation of sustainability preferences into investment decisions, especially for individuals with lower financial literacy (Anderson and Robinson, 2022). However, the empirical evidence on the relationship between SFL and sustainable investments is not unequivocal. On the one hand, studies using data from the US and the UK (Meunier and Ohadi, 2022) and from Switzerland (Filippini et al., 2024) find that fewer misperceptions about sustainable investments and higher SFL are related to self-reported sustainable investments. Similarly, recent experimental evidence provides causal support that improving SFL increases sustainable investment choices (Filippini et al., 2026). In contrast, evidence from Eurobarometer data reports no significant relationship between participants' SFL and intentions to invest sustainably (Olumekor and Oke, 2024).

SFL may also matter for greenwashing detection – that is, distinguishing between truly green investments and assets that are only marketed as “green” (cf. Gatti et al., 2021; Kleffel and Muck, 2023). Prior research shows that product labeling and naming can mislead investors (Anderson and Robinson, 2022; Cooper et al., 2005), suggesting a role for SFL in helping investors evaluate sustainability claims more critically. By raising awareness of potential greenwashing issues, SFL could allow investors to recognize misleading information. Consistent with this idea, evidence from non-investment contexts shows that literacy interventions can help consumers to better differentiate between genuinely green and greenwashed products (Fernandes et al., 2020).

Greater SFL may also be related to higher stock market participation, since better knowledge about the availability of ESG investments, which allow investors to pursue non-financial goals, may help overcome negative perceptions of the stock market (Dobni and Racine, 2015, 2016) and of stockholders (Henkel and Pugnaghi-Zimpelmann, 2026). SFL could thus mitigate stock market aversion (Kaur and Vohra, 2012; Kaustia and Torstila, 2011; Keller and Siegrist, 2006) and draw in

ethically-minded individuals who would otherwise avoid equities (Brunen and Laubach, 2022). Consistent with this, Brière and Ramelli (2021) find that offering sustainable investment options in French employee savings plans increases employees' overall equity investments.

This paper addresses two research questions motivated by these gaps in the literature: First, how does SFL relate to financial decisions, such as stock market investments, sustainable investing, and avoidance of greenwashed products? Second, to what extent is SFL distinct from existing measures of basic and advanced financial literacy – subsumed by them, or offering complementary explanatory power? Answering these questions clarifies SFL's theoretical and practical importance, both as a standalone construct and a complement to established financial literacy concepts. We focus on Austria, an EU member with robust sustainability regulations such as the EU Taxonomy and the national Austrian Eco-Label for financial products. This context supports developing a versatile SFL inventory adaptable to international settings.

To address our research questions, we conducted a preregistered and ethics-approved framed field experiment with an incentivized investment decision.⁷ Prior to the main experiment, we developed and validated a brief SFL inventory in a prestudy using data from a representative sample of the population of Austria ($N = 1047$). The item pool was derived from the literature, existing measures, three rounds of systematic consultations with twelve financial experts, and statistical analyses (exploratory and confirmatory factor analyses, analyses of item discrimination, difficulty, and homogeneity). The prestudy confirmed that the final seven-item SFL instrument is conceptually grounded and statistically reliable. We find that SFL and advanced financial literacy are relevant yet distinct predictors of participants' self-reported investments in financial markets generally and sustainable assets in particular.

In the main experiment, we investigate how SFL relates to stock market investments, sustainable investments, and potentially greenwashed investments through a framed field experiment involving an incentivized investment decision (based on Gutsche et al., 2023, and Seifert et al., 2024). Using another representative sample of the Austrian population ($N = 1510$), we asked participants to allocate 500 euros across a savings account and four different mutual funds: two traditional funds, one genuinely sustainable fund, and one fund marketed as sustainable that was subject to greenwashing allegations and changed its marketing messaging as a result.

Participants were aware that, for a randomly selected subsample, their investment decisions would be implemented in the stock market and the amount resulting after one year would be paid out to them. This allows us to study incentive-compatible decisions rather than purely hypothetical ones, as in most previous studies (Degryse et al., 2023; Filippini et al., 2024).

By comparing SFL and advanced financial literacy regarding their effect sizes and incremental variance explained (Balloch et al., 2015; Van Rooij et al., 2011), we assess SFL's unique power to explain investment decisions. We further account for a set of covariates that are plausibly related to investment decisions, including biospheric value orientation, risk preferences, investment experience, income, and education. At the end of the experiment, we debriefed the participants on the greenwashing allegations regarding one fund and allowed them to

⁷ Preregistered at Open Science Framework (OSF): <https://osf.io/ycu3x> (prestudy) and <https://osf.io/ejzr7> (main experiment). We deviate marginally from the preregistrations. First, in the prestudy, we keep participants who passed two of three attention checks in the sample and exclude those who answered *I don't know* on all 30 SFL questions. Second, in both the prestudy and the main experiment, we include household income as a binary variable using a median split (low vs. high) to facilitate interpretation. All procedures were approved by the Ethics Committee of the Institute for Advanced Studies (Case 05, 05.06.2023; Case 12, 09.10.2023).

revise their investment decisions, which then determined their final pay-offs.

The results of the main experiment show that SFL is robustly associated with greater stock market investments, more sustainable investments and fewer potentially greenwashed investments. While SFL and advanced financial literacy are correlated, SFL is associated with greater effect sizes and additional variance explained in the three incentivized outcome variables. These patterns hold across model specifications and replicate qualitatively using self-reported real-world investment behavior outside of the experiment.

SFL effects are similar among financial market participants and non-participants, suggesting that investment experience is not a primary driver of our findings (Hastings et al., 2013; Lusardi and Mitchell, 2014). Participants with high SFL are four times as likely to correctly identify the allegedly greenwashed fund in a follow-up question. Interestingly, after learning about the greenwashing allegations, a majority of participants did not adjust their investments. Those who do shift investments towards the genuinely sustainable fund and the savings account but not towards conventional funds.

The findings from the prestudy contribute to several strands of literature. First, we complement prior research on the measurement of financial literacy, which to date has rarely incorporated ESG aspects (Balloch et al., 2015; Lusardi and Mitchell, 2008; Van Rooij et al., 2011). Recent work has approached sustainability-related investment knowledge in different ways. For example, Anderson and Robinson (2022) measure financial literacy and environmental literacy separately and examine their intersection, whereas Filippini et al., (2024) explicitly conceptualize Sustainable Finance Literacy (SFL) as a distinct knowledge domain. While the conceptualization of Anderson and Robinson (2022) seems to be based on the premise that sustainable finance literacy can be logically derived from a set of core knowledge domains, we follow Filippini et al., (2024), assuming that additional novel knowledge must be acquired. This choice is further informed by discussions with twelve financial experts conducted as part of our prestudy (e.g., Austrian Financial Market Authority, Austrian Ministry for Climate Action, Austrian Environment Agency), who regularly advise investors on sustainable investment decisions. These 12 experts emphasized that investors must acquire novel, domain-specific knowledge about specific financial products, regulatory frameworks, and market practices to become capable of making informed investment decisions. Accordingly, we conceptualize SFL as a structured and direct operationalization of the intersection between financial and sustainability-related knowledge, tailored to sustainable investment decision-making. Importantly, this operationalization does not represent a simple additive combination of financial and sustainability knowledge. Rather, it captures an integrated form of knowledge that becomes relevant when financial decisions are explicitly embedded in a sustainability context. While general financial literacy provides an essential foundation, sustainable investing additionally requires familiarity with specific institutional, regulatory, and product-related features, such as sustainability labels, ESG investment strategies, disclosure requirements, and greenwashing risks. Measuring SFL directly therefore enables us to capture this investment-relevant knowledge in a coherent and targeted manner. To further reduce conceptual ambiguity, we distinguish SFL from general sustainability or ESG awareness, which reflects broader environmental knowledge and values but does not address the financial, institutional, and regulatory mechanisms specific to sustainable investing. We emphasize, however, that this conceptualization reflects a theoretically motivated modeling choice rather than a settled empirical fact. Whether SFL constitutes a genuinely distinct knowledge domain or primarily reflects general financial sophistication applied within a sustainability-specific content area remains, in our view, an open question that our data can inform but not conclusively resolve (see Discussion).

Additionally, we contribute to the emerging literature on sustainable finance and on financial literacy by developing an inventory to measure individual levels of SFL that is well-founded in theoretical, statistical,

and practical terms (Degryse et al., 2023; Filippini et al., 2024). Our inventory provides a reliable tool for future research, either as a stand-alone instrument or integrated into broader advanced financial literacy measures, thereby enabling scholars to examine relationships between SFL and pro-environmental or financial behaviors.

Second, the findings from the main experiment extend the literature on the interplay between financial literacy and broader investment behavior. We identify SFL as a critical correlate not only of sustainable investment but also of stock market participation more broadly. In doing so, we move beyond prior studies that investigated the relationship between SFL and sustainable investments using self-reported investment behavior or hypothetical decisions (Degryse et al., 2023; Filippini et al., 2024). To the best of our knowledge, our study is among the first to examine the association between SFL and incentivized investment decisions (Filippini et al., 2026), and the first to benchmark SFL against conventional advanced financial literacy rather than limiting comparisons to basic financial literacy.

Third, we contribute to the growing literature on greenwashing (Fernandes et al., 2020), including its manifestation in financial products (Gatti et al., 2021; Kleffel and Muck, 2023; Klein et al., 2022), which has recently received increased attention among regulators (see, e.g., European Banking Authority, 2023). As a methodological innovation compared to related studies (Degryse et al., 2023; Filippini et al., 2024), we provide evidence that greater SFL is associated with lower potentially greenwashed investments. We introduce a real-world investment option that has faced greenwashing allegations, enabling us to study investor allocations and their ability to detect greenwashing in the face of misleading sustainability claims. We further observe that a small share of investors revise their investment decisions after being informed about the greenwashing allegations. This finding is consistent with prior evidence that investors' willingness to pay for the impact of ESG investments does not scale proportionally with the absolute level of impact (Heeb et al., 2023). Taken together, these results support the interpretation that, for some investors, sustainable investment choices may be partly driven by "warm glow" rather than the pursuit of measurable ESG impact.

In terms of practical implications, our results suggest that SFL, through its association with investment behavior, represents a potentially important dimension for individual and societal welfare. Stock market participation, for instance, is closely linked to financial well-being and retirement provision (Bucher-Koenen et al., 2025; Lusardi and Mitchell, 2014). Sustainable investments, in turn, are relevant for societal welfare (Hong et al., 2023) and for financing the broader sustainability transition (e.g., European Commission, 2024; Eurosif, 2018). The ability to identify greenwashing is likewise critical for informed financial decision-making. Detecting misleading sustainability claims can reduce investors' vulnerability to misallocation, helping them avoid products that do not align with their preferences or that may later face greenwashing allegations, potentially resulting in reputational damage and lower resale values (Du, 2015; Gatti et al., 2021). Beyond individual benefits, the capacity to recognize greenwashing also supports the credibility and effectiveness of green finance initiatives more broadly. From an applied perspective, measuring SFL using a brief inventory may enable practitioners (e.g., financial advisors) to tailor advice to clients' SFL levels. In addition, the ability to systematically assess SFL provides policymakers with a tool to design, evaluate, and refine targeted financial literacy and sustainable finance education strategies.

2. Methods

2.1. Prestudy: development of the SFL inventory

To develop a short inventory for measuring SFL in our incentivized experiment, we conducted a prestudy ($N = 1047$, representative in terms of age and gender). We developed an initial pool of 73 items based on prior literature, expert consultations, and industry materials, reduced to

30 items through iterative refinement, and evaluated these using item discrimination, difficulty indices, and exploratory factor analysis. Based on expert ratings and statistical performance, we selected a brief seven-item inventory including core concepts of sustainable finance, such as regulation, product types, ESG strategies, and greenwashing awareness. The short scale demonstrated acceptable reliability ($\alpha = 0.62$; $\alpha_{\text{true-items}} = 0.72$) and strong correlations with the longer version consisting of the 27 suitable items (Spearman's ρ : $r_s = 0.87$), as well as a unidimensional factor structure, which was also confirmed in the main experiment. Detailed descriptions of the development process, full statistical results, and alternative scale versions are provided in Appendix A. This seven-item inventory (Table 1) was used in the main incentivized experiment described below.

2.2. Experimental design

The main experiment investigates whether SFL is associated with stock market investments, sustainable investments, and potentially greenwashed investments, with the aim of studying the relevance of SFL

Table 1
German original and English translation of the short SFL inventory items.

	German	English	True / false
Q3	Greenwashing bedeutet, dass ein Finanzprodukt beispielsweise als umweltfreundlich beworben wird, obwohl Umweltaspekte bei der Veranlagungsstrategie kaum oder nicht berücksichtigt werden.	Greenwashing means that a financial product is, for example, advertised as environmentally friendly, even though environmental aspects are hardly or not at all considered in the investment strategy.	true
Q4	Qualitätssiegel (Labels) wie das Österreichische Umweltzeichen (UZ49) sollen sicherstellen, dass ein Anlageprodukt festgelegten Nachhaltigkeitskriterien entspricht.	Quality labels such as the Austrian Eco-Label (UZ49) aim to ensure that an investment product complies with defined sustainability criteria.	true
Q5	Die EU-Taxonomie ist ein Klassifikationssystem, das festlegt, welche wirtschaftlichen Tätigkeiten als ökologisch nachhaltig (= grün) angesehen werden.	The EU Taxonomy is a classification system that defines which economic activities are considered environmentally sustainable (= green).	true
Q12	Durch Ausschlusskriterien können Staaten, Branchen bzw. Unternehmen, die bestimmte ESG-Kriterien nicht erfüllen, von der persönlichen Veranlagung ausgeschlossen werden.	Exclusion criteria can be used to exclude countries, sectors, or companies that do not fulfill certain ESG criteria from personal investments.	true
Q16	Nachhaltige Anlageprodukte können neben Einzelaktien auch Anleihen, Investmentfonds oder Indexfonds bzw. ETFs (Exchange Traded Funds) sein.	Besides individual shares, also bonds, investment funds, and index funds or ETFs (Exchange Traded Funds) can be sustainable investment products.	true
Q19	Die Gebühren für nachhaltige Anlageprodukte sind immer deutlich höher als für konventionelle Anlageprodukte.	The fees for sustainable investment products are always significantly higher than those for conventional investment products.	false
Q26	Die Gewinne sind bei nachhaltigen ESG-Finanzprodukten deutlich geringer als bei konventionellen Finanzprodukten.	The returns are significantly lower for sustainable ESG financial products than for conventional financial products.	false

Note. This table shows the German original and English translations of the seven items included in the short version of the inventory. Six items (Q3, Q4, Q5, Q12, Q16, Q19) capture institutional, regulatory, definitional, or product-related knowledge; one item (Q26) captures a belief about the relative financial performance of sustainable investments, a domain in which the theoretical and empirical evidence is genuinely debated (see Appendix A.2 for a detailed discussion and Appendix Table B.15 for a robustness check excluding this item).

relative to that of advanced financial literacy, both in incentivized and self-reported investment decisions. To this end, we conducted a framed field experiment including an incentivized investment decision (as in Gutsche et al., 2023). The full questionnaire is provided in Appendix D.

2.3. Measured variables

The main experiment extends the prestudy by incorporating an extended and redefined set of variables, described in detail below. An overview of all measured variables is provided in Table 2.

Incentivized investment decision. Participants allocated 500 euros across four funds and a savings account. This design extends the decision framework of previous studies such as Gutsche et al. (2023) and Seifert et al. (2024) by including a risk-free savings account (as in Kleffel and Muck, 2023). Fig. 1 presents the options: two conventional funds without a sustainability objective (Funds A and B), one sustainable fund (Fund D), one fund marketed as sustainable but potentially greenwashed (Fund C), and a savings account. Fund C corresponds to a historical example of documented greenwashing allegations against an investment fund.⁸ We discussed this procedure and the fund selection (Appendix B.1) with the Austrian Financial Market Authority (FMA) and Consumer Advocacy Austria (VKI). The funds were identical regarding the risk and performance presented to the participants but differed in ESG considerations and economic sectors (as per Seifert et al., 2024). Most sustainability ratings for the allegedly greenwashed fund were comparable to those of the conventional funds. Fund names were not made explicit to ensure that decisions relied solely on the information provided. Following earlier experiments (Gutsche et al., 2023; Heeb et al., 2023), we limited the amount of information to prevent overload and to keep the experiment reasonably short. We used information sources typically accessible to retail investors (e.g., Cleanvest ratings), instead of proprietary institutional ratings such as the Refinitiv Eikon ESG rating.

Our three main outcome variables for the initial investment decision were stock market investments (percentage of the endowment allocated to four funds as opposed to the savings account), sustainable investments (percentage of stock market investments allocated to the two funds marketed as sustainable), and potentially greenwashed investments (percentage of sustainable investments allocated to the allegedly greenwashed fund).⁹

Revised investment decision. After debriefing participants about the greenwashing allegations against Fund C towards the end of the survey, we allowed them to revise their investment decision. Presenting the same fund selection again (Fig. 1), we recorded stock market investments, sustainable investments, and potentially greenwashed investments in the revised decision. This setup enabled us to calculate changes in each of the three outcome variables as well as specific

⁸ In 2022, the Baden-Württemberg Consumer Center, a German non-profit consumer protection organization, levelled greenwashing allegations against Fund C, leading the fund's issuer to sign a cease-and-desist declaration and to change the fund's marketing material, while not admitting to any misconduct. The allegations involved non-transparent advertising and excessive claims, e.g., that investors in the fund were investing "specifically in the achievement of climate goals" and they would "help counteract climate change through targeted investment". Original statement in German: <https://www.verbraucherzentrale-bawue.de/presse-meldungen/presse-bw/klage-gegen-dws-wegen-greenwashing-78104>. German report on cease-and-desist declaration: <https://www.oreporter.de/artikel/greenwashing-verdacht-dws-unterschreibt-unterlassungserkl%C3%A4rung/>. Reuters report in English: <https://www.reuters.com/business/finance/deutsche-banks-dws-sued-by-consumer-group-over-alleged-greenwashing-2022-10-24/>.

⁹ We assigned a value of zero to sustainable investments for participants who did not invest in the stock market to avoid divisions by zero. We adopted this procedure because we focus on sustainable investments among all potential investors who could contribute to the sustainability transition. Notably, 85.36% of all participants invested a positive amount in the funds.

Table 2
Variable definitions.

Variable name	Definition	Used in prestudy
Advanced financial literacy (objective)	Objective advanced financial literacy (three questions, selected based on highest factor loadings in Van Rooij et al., 2011); proportion of correct answers (range: 0–1)	Yes
Age	Participant age (years)	
Altruistic value orientation	Concern for social justice and equality	
Biospheric value orientation	Individuals' consideration of unity with nature and protecting the environment	
Gender: Female	Female (=1) – binary variable	Yes
General trust	Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people? (1 = you can't be too careful, 7 = most people can be trusted)	
Greenwashing beliefs	Sustainable investments constitute greenwashing (1 = completely disagree, 7 = completely agree)	
Greenwashing identification	Correct identification of potentially greenwashed fund – binary (=1 if correct)	
Hassle factor sustainable investments	Investing in ESG investments is complicated and needs a lot of time and effort (1 = completely disagree, 7 = completely agree)	Yes
Household income above median	Household income above sample median – binary (=1)	Yes
Household income not reported	Household income not reported – binary (=1)	Yes
Investment experience	Years of experience with stocks, funds, bonds, etc. (ordinal: no experience to >11 years in 2-year-increments)	Yes
Patience	Generally speaking, how willing are you to give up something that is beneficial for you today in order to benefit more from that in the future? (1 = not at all willing, 7 = very willing)	
Left-wing	Political orientation (1 = right, 7 = left)	
Potentially greenwashed investment	Percentage of sustainable investments allocated to the allegedly greenwashed fund	
Reason for ESG investment	Main reason for sustainable investing (1 = mainly a financial reason (e.g., performance), 2 = mainly a non-financial reason (e.g., ESG impact))	
Revised investment	Stock market / sustainable / potentially greenwashed investment after greenwashing disclosure	
Risk taking	How willing are you to take risks in financial matters (1 = not at all willing, 7 = very willing to take risks)	
Self-reported stock market investments	Share of financial market products (e.g., stocks, bonds, funds) relative to overall wealth (0 = 0%, 1 = 1–24%, 2 = 25–50%, 3 = 51–75%, 4 = 76–99%, 5 = 100%)	
Self-reported sustainable investments	Share of sustainable investment products among financial assets (0 = 0%, 1 = 1–24%, 2 = 25–50%, 3 = 51–75%, 4 = 76–99%, 5 = 100%)	
Self-reported greenwashed investments	When purchasing sustainable investments, I seek additional information (e.g., eco-labels, ratings) to verify environmental claims (1 = always, 5 = never; reversed)	
Stock market image	Views on the stock market: wealth creation capacity, immorality, and the importance of ESG factors (1 = completely disagree, 7 = completely agree)	

Table 2 (continued)

Variable name	Definition	Used in prestudy
Stockholder image	Views of stockholders as greedy, selfish, or gambler-like (1 = completely disagree, 7 = completely agree)	
Stock market investments	Percentage of the endowment allocated to the four funds versus the savings account	
Subjective ability to identify greenwashing	Compared to the Austrian population, how well can you assess which financial investments are eco-friendly and which are not? 7-point Likert scale (1 = not good at all, 7 = very good)	
Sustainable finance literacy (SFL)	Proportion of correct answers to seven SFL questions (1 = true, 2 = false, 3 = I do not know) mapped to a range from 0 to 1	Yes (other answer format)
Sustainable investments	Percentage of stock market investment allocated to the two funds marketed as sustainable	
University degree	University degree (=1) – binary	

allocation amounts before and after the disclosure.

Self-reported investment behavior. We further collected self-reported information on financial market participation, sustainable investments, and potentially greenwashed investments. For self-reported financial market investments, participants indicated whether they own financial assets (e.g., stocks, bonds, or funds) and the total share of financial products relative to their overall wealth (1 = 1–24%, up to 5 = 100% – *I only own financial assets such as stocks or funds*). Non-owners were coded 0 = 0% – *I do not have stocks, bonds, or funds* in this question. For self-reported sustainable investments, participants reported the share of sustainable assets among their financial assets (stocks, bonds, funds) in a single choice question (0 = 0% – *I do not own sustainable assets*, 1 = 1–24%, 2 = 25–50%, 3 = 51–75%, 4 = 76–99%, 5 = 100% – *I only own sustainable assets*). For self-reported greenwashed investments, we relied on a proxy measure because investors are often unaware of owning greenwashed products. Participants rated the statement “*When purchasing a sustainable investment, I seek additional information (e.g., eco-labels, sustainability ratings, independent reports) to ensure that the environmental promises are true*” on a reversed 5-point scale (1 = *always*, 5 = *never*).¹⁰

Greenwashing identification and attention check. We included two follow-up questions to assess participants' perceptions of the investment products' properties and their ability to identify potential greenwashing. The first question asked participants to rate the sustainability of each product (7-point Likert scale, anchored at 1 = not at all sustainable, 7 = very sustainable). The second question asked participants to identify which fund was most likely engaged in greenwashing, with answer options for each fund and a “none of the funds” choice. This generated a binary outcome for correctly identifying the potentially greenwashed product.¹¹ An attention check was randomly included among the SFL

¹⁰ We measured greenwashing-related behavior via self-reported information search and due diligence. This proxy captures respondents' willingness to acquire additional information when confronted with potential greenwashing, rather than realized avoidance of greenwashed products. Actual avoidance is challenging to observe empirically, as confirmed greenwashing cases remain rare due to regulatory disclosure requirements, and retail investors are often unaware of such incidents. Results for this measure should thus be interpreted as reflecting awareness and behavioral intentions rather than definitive actions.

¹¹ Answering the second follow-up question was mistakenly not mandatory in our survey software. Thus, we have 13 missing values in this outcome variable, of which nine are among the participants who invested sustainably, reducing the sample size for analyses regarding the identification of potentially greenwashed investments.

Fund	Fund A	Fund B	Fund C	Fund D	Savings account
Short description	This fund invests in equity and equity-related securities of small and mid-cap companies in the energy sector and seeks capital growth.	This fund invests in companies in the oil & gas, service, power, gas, and other sectors of the energy industry.	This fund invests in companies through which investors make targeted investments to achieve climate goals and help counteract climate change through targeted investing.	This fund invests in companies that seek to reduce energy-related greenhouse gases and/or are sustainable according to ESG criteria.	This savings account offers the opportunity to invest money for one year tied at a fixed rate of interest.
Sustainability-related disclosure according to SFDR	Article 6 - Fund without consideration of sustainability criteria	Article 6 - Fund without consideration of sustainability criteria	Article 8 - Fund that promotes environmental or social characteristics	Article 9 - Fund that has a sustainable investment objective	-
Sustainability label	none	none	none	Austrian Eco-Label (UZ49), FNG-Label	-
Cumulative performance over the last 3 years	more than 12%	more than 12%	more than 12%	more than 12%	2% interest per year
Risk and return profile	Medium risk	Medium risk	Medium risk	Medium risk	-
Fund volume (in euros)	> 136 million	> 136 million	> 136 million	> 136 million	-
Fees	ca. 2% per year	ca. 2% per year	ca. 2% per year	ca. 2% per year	none
Geographical orientation	global	global	global	global	not specified
Compliance with EU-taxonomy	0% taxonomy-compliant	0% taxonomy-compliant	0% taxonomy-compliant	31% taxonomy-compliant, 50% taxonomy-able	not specified
Cleanvest ESG-Rating (1 = low, 10 = high)	5.6 out of 10	5.2 out of 10	7.0 out of 10	8.2 out of 10	not specified
Carbon intensity (per million US-Dollars invested)	327.3 tons	199.8 tons	241.1 tons	163.3 tons	not specified
Top 10 holdings (share of fund volume in %)	Galp Energia (6.5%) USD Cash (4.38%) Ovintiv Inc (3.87%) Harbour Energy (3.63%) Shell (3.49%) Marathon Oil (3.45%) Drax Group (3.35%) Baker Hughes (3.21%) Equinor Asa (3.21%) John Wood Group (2.99%)	Baker Hughes (5.27%) Equinor Asa (4.97%) TotalEnergies (4.71%) Shell (4.66%) Repsol (4.37%) Eni Spa (4.19%) Edp Renovaveis (3.82%) Galp Energia (3.71%) OMV (3.71%) Inpex (3.37%)	Darling Ingredients (3.63%) Republic Services (3.41%) Schneider Electric (2.89%) Marsh & McLennan (2.58%) Veolia Environnement (2.53%) Owens Corning (2.47%) Nomad Foods (2.39%) Microsoft (2.36%) L'Air Liquide Societe (2.35%) Solaredge Techno (2.34%)	ON Semiconductor (5.42%) EUR Cash (4.65%) Wolfspeed (4.22%) SolarEdge Tech (4.19%) Orsted (4.01%) Schneider Electric (3.76%) Infineon Tech (3.76%) Quanta Services (3.67%) First Solar (3.47%) Itron (3.01%)	-

Fig. 1. Incentivized investment decision as presented to the participants. *Note.* This figure shows the four equity mutual funds and the savings account used in the incentivized investment decision (English translation).

questions (“Please choose ‘false’ here”). Participants failing this check were excluded and replaced ($N = 134$).

SFL, advanced financial literacy, and other explanatory variables. In the post-experiment survey, we measured our main explanatory variable SFL using the 7-question inventory developed in the prestudy with a true/false answer format plus an “I don’t know” option. SFL represents the proportion of correct answers to the seven questions, mapped to a range from 0 to 1. We include advanced financial literacy, measured by three questions (as in the prestudy, selected for the highest factor loadings in Van Rooij et al., 2011), with the total number of correct answers again mapped to a range from 0 to 1, as the second most important explanatory variable (Balloch et al., 2015; Lusardi and Mitchell, 2014; Van Rooij et al., 2011). Basic financial literacy was omitted from the main experiment, since the prestudy results showed that it offered limited explanatory power for (sustainable) investment behavior once advanced financial literacy and SFL were taken into account. Given the high fraction of correct answers and the low discriminatory power in our representative sample, we therefore prioritized advanced financial literacy and SFL as relevant knowledge dimensions.

Additional control variables. We collected established predictors of investment decisions as control variables, including: stock market image (i.e., participants’ views about the stock market in terms of wealth creation capacity, immorality, and the importance of ESG factors; Dobni and Racine, 2015, 2016; Jeong et al., 2014), stockholder image (perceptions of stockholders as greedy, selfish, or gambler-like; Henkel and Pugnaghi-Zimpelmann, 2026), hassle factor (perceived complexity of sustainable investing; Sivaramakrishnan et al., 2016), beliefs that sustainable investments involve greenwashing (Degryse et al., 2023), biospheric and altruistic value orientation (i.e., caring for an intact environment and for others’ utility; De Groot and Steg, 2007, 2008), risk taking (Dohmen et al., 2011; Henkel and Pugnaghi-Zimpelmann, 2026), patience (Falk et al., 2018; Gutsche et al., 2023), general trust (Balloch

et al., 2015; Guiso et al., 2008; Nilsson, 2008), political orientation (Kaustia and Torstila, 2011) and sociodemographic variables (gender, age, household income, education). We also measured motivations for ESG fund investments (financial vs. non-financial reasons) and subjective ability to identify greenwashing (inspired by Degryse et al., 2023).

2.4. Participants

We recruited a sample of 1510 participants, representative of the Austrian population aged 18 and older, in terms of age, gender, and university degree attainment. Participants were recruited via the market research agency TalkOnline Panel GmbH between October and November 2023.¹² The sample comprised 51.20% women with an average age of 49.03 years ($SD = 16.92$). University-degree holders represented 15.30%. The sample’s median net household income fell within the 3001–4000 euros range, aligning with Austria’s median net household income of 3227 euros in 2023 (Statistics Austria, 2024). Financial market participation – defined as the ownership of funds, stocks, or bonds – was reported by 43.31% of the participants, with 30.72% holding sustainable investments. Investment-related experience ranged from none (50.20%) to our top category of more than 11 years (15.96%).

2.5. Procedure and incentives

We began by informing participants about the monetary incentives: five would be randomly selected via lottery, and for these winners, we

¹² We applied quotas for university degree holders to correct for oversampling in the prestudy relative to the Austrian population. We excluded three of the initially 1513 complete responses due to repeated participation.

would invest their allocated amounts in the chosen funds or savings account, sell after one year, and pay out the resulting values (as in Gutsche et al., 2023; Seifert et al., 2024). The first stage mimicked a financial advisory setting: participants imagined visiting a bank to invest 500 euros and then made their incentivized allocation decision (Fig. 1). Next, we measured SFL, advanced financial literacy, control variables, and other investment-related measures. Follow-up questions about the products' properties – including greenwashing identification – appeared toward the end to minimize spillover effects on prior responses.

Finally, we debriefed the participants on the greenwashing allegations against Fund C (which prompted changes to its marketing claims) and offered the option to revise their allocation. Winners' payouts were based on these final allocations.¹³ Participants received a link to SFL training materials, submitted emails for the lottery, and earned a standard participation fee from the agency. Median completion time was 12.24 min.

3. Results

The descriptive results reported in Table 3 indicate that participants

Table 3
Descriptive statistics of incentivized investment behavior and the follow-up questions.

Outcome variable	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Stock market investments (% of endowment)	1510	70.9%	35.0%	0%	100%
ESG investments (% of stock market investment)	1510	48.1%	37.7%	0%	100%
Potentially greenwashed investment (% of ESG)	1081	43.5%	30.3%	0%	100%
Investment Fund A (conventional)	1510	€81.76	€113.44	€0	€500
Investment Fund B (conventional)	1510	€74.39	€107.18	€0	€500
Investment Fund C (potentially greenwashed)	1510	€83.20	€104.08	€0	€500
Investment Fund D (sustainable)	1510	€115.30	€132.90	€0	€500
Investment savings account	1510	€145.35	€174.93	€0	€500
Sustainability rating Fund A	1510	3.16	1.50	1	7
Sustainability rating Fund B	1510	2.96	1.51	1	7
Sustainability rating Fund C	1510	4.43	1.47	1	7
Sustainability rating Fund D	1510	4.88	1.36	1	7
Sustainability rating savings account	1510	3.98	1.68	1	7
Greenwashing correctly identified	1497	27.6%	44.7%	0	100%

Note. This table reports the descriptive statistics of the outcome variables included in the econometric analyses of the incentivized investment decision as well as of the follow-up questions. *N* = number of observations, *M* = mean, *SD* = standard deviation. Because participants who did not invest in sustainably marketed funds (*N* = 429) are excluded from the analyses of potentially greenwashed investments reported in Table 6, statistics for this outcome are presented for the corresponding subsample only (*N* = 1081). The greenwashing identification question was inadvertently not programmed as mandatory in our survey software, resulting in *N* = 13 missing responses. Note that participants judged the sustainability ratings of the funds while seeing all fund details (Fig. 1) which might have affected their ratings. Finally, percentage shares of investments do not always correspond perfectly to the euro amounts, since we record zero sustainable investments for participants who did not invest in the stock market, as described in Section 2.3.

¹³ After consulting with other experimental researchers, we concluded that the procedure does not amount to deception. Participants faced no negative consequences, and they were allowed to revise the decision after being debriefed, or to stick with their initial decision. The descriptions, including that of the allegedly greenwashed fund, furthermore stemmed from existing funds, which participants could have encountered in real-world investment decisions. We anticipate no negative impacts on the participant pool.

invested an average of 354.65 euros out of their total endowment of 500 euros (i.e., 70.9%) in the stock market and allocated the remaining 145.35 euros (i.e., 29.1%) to the savings account. Of the total amount invested in funds, 48.1% was directed toward funds marketed as sustainable. Among participants who invested in funds marketed as sustainable (*N* = 1081), 43.5% of their allocations were placed in the fund subsequently associated with greenwashing allegations. Participants invested significantly more in Fund D ($p < 0.001$) than would be predicted by a 1/*n* or naïve diversification strategy, which implies an equal allocation across all available funds (Benartzi and Thaler, 2001). Responses to the first follow-up question indicate that participants were able to correctly identify Fund D as the most sustainable fund. In the second follow-up question, 27.59% correctly identified the potentially greenwashed product, while 26.65% indicated that none of the products was likely to have been greenwashed.¹⁴

On average, participants correctly answered 49.09% (*SD* = 27.89%; *Median* = 4) of the seven SFL questions, which aligns with the average in the prestudy (*U*-test, $p = 0.168$). Table B.2 in the Appendix provides a detailed comparison of correct responses per SFL question between the prestudy and the main experiment. For advanced financial literacy, participants answered, on average, 2 out of 3 questions correctly (*Median* = 2; *M* = 0.66, *SD* = 0.33; *U*-test; $p < 0.001$). Consistent with the prestudy, SFL is positively correlated with advanced financial literacy ($r_s = 0.46$, $p < 0.001$). Table B.3 in the Appendix links overall SFL as well as correct responses to each of the seven SFL items to investment behavior and the identification of potential greenwashing. For example, participants who correctly answered the item assessing the meaning of greenwashing (Q3) were more likely to identify the allegedly greenwashed fund in the follow-up question and less likely to indicate that none of the funds constituted a case of greenwashing. Descriptive statistics for all explanatory variables included in the subsequent regression models are reported in Table B.4.

SFL is significantly lower (*U*-test, $p < 0.001$) among women (*M* = 0.45, *SD* = 0.28) than among men (*M* = 0.53, *SD* = 0.28). Also, confidence in answering the questions correctly is lower (*U*-test, $p < 0.001$) among women (*M* = 3.04, *SD* = 1.46) than among men (*M* = 3.64, *SD* = 1.52).

3.1. SFL is associated with greater stock market investment

To examine whether SFL predicts stock market investment, we estimate a series of econometric models regressing stock market investment on SFL (Table 4). Control variables are added successively, resulting in four hierarchical models. Model (1) includes only advanced financial literacy, Model (2) includes SFL, Model (3) includes both, and Model (4) additionally controls for demographic and socioeconomic factors and further control variables. The full hierarchical specifications are

¹⁴ Although the overall percentage of correct identification is relatively low, it is unlikely that identification occurred purely by chance. First, participants received an explicit definition of greenwashing in the second follow-up question. Second, correct identification was positively associated with higher SFL (Table 7). Third, identification was systematically more prevalent among participants with characteristics that are theoretically expected to facilitate awareness and identification, including greater investment experience ($r_s = 0.08$, $p = 0.003$), higher advanced financial literacy ($r_s = 0.12$, $p < 0.001$), higher sustainable finance literacy ($r_s = 0.19$, $p < 0.001$), holding a university degree ($r_s = 0.11$, $p < 0.001$), prior ownership of sustainable investments ($r_s = 0.09$, $p < 0.001$), stronger beliefs that “green” assets are often subject to greenwashing ($r_s = 0.07$, $p < 0.01$), and a lower hassle factor ($r_s = -0.08$, $p < 0.01$). These patterns support the interpretation that the measure captures meaningful variation in greenwashing awareness, despite its noisiness. Among all participants, 18.23% incorrectly identified the sustainable Fund as greenwashed, while 12.36% and 17.17%, respectively, selected Funds A or B. The moderate identification rate likely reflects task complexity, particularly for those with low SFL.

Table 4
OLS-regression of stock market investments on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		0.366*** (0.031)	0.294*** (0.035)	0.187*** (0.035)
Advanced financial literacy	0.243*** (0.026)		0.128*** (0.029)	0.084** (0.030)
Female (Ref.: male)				-0.037* (0.018)
Age in years				-0.0003 (0.0006)
University degree (Ref.: no)				-0.013 (0.024)
High household income				0.006 (0.020)
Household income not reported				-0.016 (0.023)
Investment experience in years				-0.006 (0.004)
Constant	0.548*** (0.019)	0.530*** (0.017)	0.480*** (0.021)	0.462*** (0.081)
Additional control variables	NO	NO	NO	YES
N	1510	1510	1510	1510
R2	0.054	0.085	0.097	0.186
R2 adj.	0.053	0.085	0.096	0.175

Note. This table presents the results of the hierarchical models regressing stock market investments on SFL, control variables added successively across models. Model (4) additionally controls for stockholder image; stock market image with respect to immorality, wealth creating capacity, and ESG orientation; hassle factor; greenwashing beliefs; biospheric values; altruistic values; risk taking; patience; general trust; and left-wing views. Standard errors are reported in parentheses. ⁺ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

reported in Table B.5 in the Appendix; gender-specific analyses in Table B.11.

In Model (2), SFL is associated with a 36.61 %age-point increase in stock market investments [95% CI: 0.31; 0.43], and with an 18.7 %age-point increase [95% CI: 0.12; 0.26] in Model (4). Advanced financial literacy relates to a 24.31 %age-point increase [95% CI: 0.19; 0.29] in Model (1), and an 8.4 %age-point increase [95% CI: 0.03; 0.14] in Model (4). Wald tests indicate that the coefficients for SFL are significantly larger than those for advanced financial literacy in Model (3) ($F(1, 1507) = 9.27, p = 0.002$), while the difference is only marginally significant in Model (4) ($F(1, 1507) = 3.70, p = 0.054$). Hierarchical regression analyses further show that Model (3) accounts for significantly more of total variance than Model (1) does ($\Delta R^2: F(1, 1507) = 2.139, p < 0.001$).

Overall, the results suggest that SFL is a stronger predictor of stock market investments than is advanced financial literacy, and it remains significant even when controlling for advanced financial literacy. Following Cronqvist et al. (2015), we explore potential mechanisms using a mediation analysis (see Appendix B.4 for details). The findings indicate that the relationship between SFL and stock market investments is weakly mediated by a more favorable perception of the stock market, specifically regarding its perceived morality and wealth creating capacity, as well as stockholders, who are viewed as less greedy, selfish, or gambler-like.

3.2. SFL is associated with greater sustainable investments

To examine whether SFL predicts sustainable investments, we apply the same model specifications as in Table 4, with sustainable investments as the dependent variable and report the results in Table 5. Full stepwise models are presented in Table B.6 in the Appendix. SFL accounts for an increase in sustainable investments of 32.80 %age points [95% CI: 0.26; 0.39] in Model (2), and one of 25.1 %age points [95% CI: 0.17; 0.33] in Model (4). Advanced financial literacy relates to a significant increase of 15.49 %age points [95% CI: 0.10; 0.21] in Model (1) and a non-significant increase of 4.52 %age points [95% CI: -0.02; 0.11] in Model (4). Wald-tests for coefficient equality indicate that the

Table 5
OLS-regression of sustainable investments on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		0.328*** (0.034)	0.309*** (0.038)	0.251*** (0.039)
Advanced financial literacy	0.155*** (0.029)		0.034 (0.032)	0.045 (0.032)
Female (Ref.: male)				0.021 (0.020)
Age in years				-0.001* (0.0006)
University degree (Ref.: no)				-0.021 (0.026)
High household income				-0.007 (0.022)
Household income not reported				0.033 (0.025)
Investment experience in years				-0.004 (0.004)
Constant	0.378*** (0.021)	0.320*** (0.019)	0.307*** (0.023)	-0.067 (0.088)
Additional control variables	NO	NO	NO	YES
N	1510	1510	1510	1510
R2	0.019	0.059	0.060	0.162
R2 Adj.	0.018	0.058	0.059	0.150

Note. This table presents the results of the hierarchical models regressing sustainable investments on SFL, with control variables successively added across models. Model (4) additionally includes controls for stockholder image; stock market image regarding immorality, wealth-creating capacity, and ESG orientation; hassle factor; greenwashing beliefs; biospheric and altruistic values; risk taking; patience; general trust; and left-wing political orientation. Standard errors are shown in parentheses. ⁺ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

estimates for SFL are significantly higher in Models (3) and (4), with $p < 0.001$ for both tests. Two-step regression analyses further show that Model (3) accounts for significantly more variance than Model (1) ($\Delta R^2: F(1, 1507) = 8.767, p < 0.001$). Overall, these results suggest that SFL explains sustainable investments better than does advanced financial literacy. Mediation analyses indicate that this relationship is modestly mediated by reduced perceptions of ESG investments as greenwashing (Appendix B.4).

3.3. SFL is associated with lower potentially greenwashed investments

To examine whether SFL predicts fewer potentially greenwashed investments, we re-estimate the models from Table 5 using potentially greenwashed investments as the dependent variable and report the results in Table 6. By definition, only participants who have invested sustainably are included in these analyses ($N = 1081$). The full stepwise models are provided in Table B.7 in the Appendix. We find that SFL relates to a reduction in potentially greenwashed investments by 17.70 %age points [95% CI: -0.24; -0.11] in Model (2), and to one of 13.4 %age points [95% CI: -0.21; -0.05] in Model (4). Advanced financial literacy relates to a 10.70 %age-point reduction in potentially greenwashed investment [95% CI: -0.16; -0.05] in Model (1); but this effect becomes insignificant once SFL and other variables are included. Wald tests indicate that the SFL coefficient estimates are marginally larger than those for advanced financial literacy in Model (4) ($F(1, 1060) = 3.69, p = 0.055$), while they are not significant in Model (3) ($F(1, 1078) = 2.50, p = 0.114$). Two-step regression analyses further show that Model (3) accounts for significantly more of total variance than Model (1) ($\Delta R^2: F(1, 1078) = 14.808, p < 0.001$). Testing the potential mechanism, we do not find any significant indirect effect of our proposed mediators (i.e., the subjective ability to identify greenwashing, and the belief that “green” assets are usually greenwashed) in explaining potentially greenwashed investments in the incentivized decision (Appendix B.4).

Logit regressions (Table 7) indicate that the probability of correctly identifying the product that faced greenwashing allegations increases

Table 6
OLS-regression of potentially greenwashed investments on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		-0.177*** (0.034)	-0.148*** (0.038)	-0.134** (0.041)
Advanced financial literacy	-0.107*** (0.028)		-0.054+ (0.031)	-0.018 (0.033)
Female (Ref.: male)				0.002 (0.020)
Age in years				-0.0006 (0.0006)
University degree (Ref.: no)				-0.025 (0.026)
High household income				-0.023 (0.023)
Household income not reported				-0.0004 (0.026)
Investment experience in years				-0.008+ (0.004)
Constant	0.508*** (0.021)	0.529*** (0.020)	0.550*** (0.024)	0.698*** (0.091)
Additional control variables	NO	NO	NO	YES
N	1081	1081	1081	1081
R2	0.013	0.024	0.027	0.050
R2 Adj.	0.012	0.023	0.025	0.032

Note. This table reports the results of the hierarchical models regressing potentially greenwashed investments on SFL, with control variables added successively across models. Model (4) additionally includes controls for stockholder image; stock market image regarding immorality, wealth-creating capacity, and ESG orientation; hassle factor; greenwashing beliefs; biospheric and altruistic values; risk taking; patience; general trust; and left-wing political orientation. Standard errors are shown in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 7
Logistic regression of greenwashing identification on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		1.512*** (0.270)	1.552*** (0.298)	1.456*** (0.323)
Advanced financial literacy	0.468* (0.212)		-0.075 (0.237)	-0.106 (0.255)
Female (Ref.: male)				-0.071 (0.153)
Age in years				-0.006 (0.005)
University degree (Ref.: no)				0.388* (0.187)
High household income				0.055 (0.173)
Household income not reported				0.097 (0.200)
Investment experience in years				-0.017 (0.033)
Constant	-1.204*** (0.163)	-1.714*** (0.169)	-1.684*** (0.193)	-2.109** (0.718)
Additional control variables	NO	NO	NO	YES
N	1072	1072	1072	1072
Nagelkerke pseudo R2	0.007	0.044	0.044	0.089

Note. This table presents the results of the hierarchical logistic models regressing the correct identification of the allegedly greenwashed fund on SFL, with control variables successively added across models. Model (4) additionally includes controls for stockholder image; stock market image regarding immorality, wealth-creating capacity, and ESG orientation; hassle factor; greenwashing beliefs; biospheric and altruistic values; risk taking; patience; general trust; and left-wing political orientation. Standard errors are shown in parentheses. + $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

with higher SFL. When calculating the odds ratios, the results indicate

that the odds for correctly identifying this fund are about four times higher with perfect SFL than with no SFL (odds ratio Model (3) = 4.72, $p < 0.001$; odds ratio Model (4) = 4.29, $p < 0.001$). The odds ratios for advanced financial literacy remain below 1 and are not significant (odds ratio Model (3) = 0.93, $p = 0.753$; odds ratio Model (4) = 0.90, $p = 0.678$). Tests of coefficient equality show that the estimates for SFL are significantly higher in Models (3) and (4), with $p < 0.002$ in both Wald tests. These results reinforce the former finding that high SFL is associated with fewer potentially greenwashed investments, as participants with high SFL are substantially more likely to correctly identify the fund that faced greenwashing allegations. Advanced financial literacy, by contrast, does not account for this ability.

3.4. Robustness checks and external validation with self-reported investment behavior

Robustness checks in Appendix B.5 confirm that the main results of our hypothesis tests (Table 4, Table 5, Table 6) are qualitatively robust to excluding all participants who did not provide an email address, answered “I don't know” on all literacy questions, or spent less than 30 s on the SFL questions or on the investment decision. This exclusion enhances the reliability and validity of our findings.

We conducted additional robustness checks to address potential effects of previous investment experience – specifically, the possibility that real-world financial market investments or owning sustainable investments might drive SFL and the effects of SFL on behavior. We split our sample into financial market participants ($N = 654$) and non-participants ($N = 856$), excluding investment experience as a control variable in the latter group. We replicate the main analyses for all three outcome variables in each subgroup, omitting investment experience as a control among non-participants, with detailed results in Appendix B.5. This approach examines whether the SFL–investment relationship also appears in subgroups where prior investment experience is less likely to explain the association.

Estimates for SFL remain robust across stock market investments (Table B.12), sustainable investments (Table B.13) and potentially greenwashed investments (Table B.14), with coefficients often qualitatively larger in magnitude among non-participants than among financial market participants – the opposite of what an experience-driven artifact would predict. These findings reduce the concern that investment experience alone drives the association between SFL and investment behavior, as the main patterns are also observed among participants without current financial market participation. However, while this pattern is more consistent with a causal channel from SFL to behavior rather than the reverse, it cannot fully rule out reverse causality or other forms of endogeneity.¹⁵ As a further robustness check, we re-estimate all main analyses using an alternative SFL index that excludes the performance-related item Q26, which, unlike the other six items, captures a belief about a contested empirical regularity rather than institutional or definitional knowledge (Appendix A.2). The exclusion of Q26 does not materially affect effect sizes, statistical significance, or the relative explanatory power of SFL compared to advanced financial literacy (Appendix Table B.15).

As a final robustness check, we estimated models including an interaction term between SFL and advanced financial literacy (Appendix Table B.16). The interaction coefficient is negative and statistically significant for stock market investments, suggesting that the association between SFL and stock market investment is stronger among individuals with lower levels of advanced financial literacy. The interaction term is

¹⁵ Among the non-participants, 17.5% reported having some level of experience, of which 3.3% had less than a year, and another 3.3% between one and two years. When we rerun the analyses, splitting the data for those with self-reported investment experience ($N = 752$) and without experience ($N = 758$), the results remain largely unchanged.

not statistically significant for sustainable investments or potentially greenwashed investments.

To test the external validity of our results, we replicate the analyses regarding the relationship between SFL and, respectively, financial market investments, sustainable investments and the potentially greenwashed investment, using similar self-reported behaviors as in the prestudy as the outcome variable in ordered probit regressions. The results in Appendix B.7 show that, with regards to financial market investments, the estimates for SFL are significant and the odds of holding greater amounts in stock market products are about four times higher when SFL is high in Model (3). With the introduction of additional control variables in the subsequent models, however, the estimates of SFL become insignificant, and the odds ratio in Model (4) is 1.03. Our results regarding the relationship between the share of sustainable investments held and SFL (Table B.17) are robust across specifications: individuals with high SFL are on average about 3.5 times as likely to hold larger shares of sustainable investments. Moreover, as SFL increases, so does the likelihood of seeking additional information to avoid greenwashing.

3.5. Revised investment decisions

Following the debriefing and disclosure of the greenwashing allegations against one fund, a majority of participants (65.37%) who had invested in the potentially greenwashed fund ($N = 849$) did not revise their investment decisions. Those who revised their allocations reduced their investment in the allegedly greenwashed fund by an average of 76.22% (from 169.94 euros to 40.41 euros, on average). They shifted their investments towards the genuinely sustainable fund, increasing their initial investment in this fund by 69.07%, and, to a lesser extent, toward the savings account, increasing their allocation there by 26.39%. Investments in conventional Funds A and B did not change materially.

Overall, we observe a decline in both stock market investments (-4.2 %age points) and sustainable investments (-7.9 %age points) after participants learned about greenwashing allegations concerning Fund C. Detailed statistics on initial investments, differences in the revised investment decision, and associated test results are reported in Table B.18 in the Appendix.

Comparing investors who initially invested in the potentially greenwashed fund but chose not to revise their decisions with those who did reveals several differences (Table 8). Non-revising investors exhibited significantly lower SFL and lower advanced financial literacy. They were more likely to invest sustainably for financial rather than for ESG reasons. Additionally, they had expressed weaker beliefs in the stock market's wealth-creation capacity, and displayed lower biospheric and altruistic value orientations. They also tended to be less patient and to hold less left-wing political views.

However, these groups did not differ significantly in terms of gender, age, high household income, investment experience, level of trust, or risk taking.

4. Discussion

4.1. Causality and correlates of SFL

The main experiment aimed to show how SFL is associated with downstream investment behaviors and to determine its importance in investment decisions, on its own and relative to other concepts of financial literacy. Prior research had considered the role of basic and advanced financial literacy (Filippini et al., 2024; Rossi et al., 2019) as well as environmental literacy (Anderson and Robinson, 2022; Bethlendi et al., 2022; Filippini et al., 2024) in sustainable investments, finding weak to modest effects. Our results show that SFL robustly relates to greater stock market investments, greater sustainable investments, and fewer potentially greenwashed investments. When comparing SFL with advanced financial literacy to gauge their relative

Table 8

Comparison of participants who revised and did not revise their investment.

	Revision ($N = 294$)	No revision ($N = 555$)	Total ($N = 849$)	p -value
Sustainable finance literacy	0.55 (0.26)	0.49 (0.27)	0.51 (0.27)	0.003
Advanced financial literacy	0.72 (0.30)	0.63 (0.34)	0.66 (0.33)	< 0.001
Reason pro SI: ESG reason	1.51 (0.50)	1.29 (0.45)	1.37 (0.48)	< 0.001
Gender (female)	0.54 (0.50)	0.50 (0.50)	0.52 (0.50)	0.230
Age	47.02 (17.18)	46.55 (17.42)	46.71 (17.33)	0.711
University degree	0.18 (0.39)	0.14 (0.35)	0.16 (0.36)	0.099
High household income	0.26 (0.44)	0.23 (0.42)	0.24 (0.43)	0.433
Household income not reported	0.17 (0.37)	0.15 (0.36)	0.16 (0.37)	0.658
Investment experience	2.03 (2.58)	2.12 (2.45)	2.09 (2.49)	0.617
Stockholder image	3.85 (1.20)	3.84 (1.22)	3.84 (1.22)	0.877
SMI: Immorality	3.54 (1.42)	3.60 (1.43)	3.58 (1.43)	0.542
SMI: Wealth creating	4.06 (1.15)	3.88 (1.30)	3.95 (1.25)	0.045
SMI: ESG	4.50 (1.41)	4.45 (1.37)	4.47 (1.38)	0.670
Hassle factor SI	4.13 (1.43)	4.09 (1.42)	4.10 (1.42)	0.716
Greenwashing beliefs	4.34 (1.29)	4.34 (1.18)	4.34 (1.22)	0.965
Biospheric Values	5.79 (0.99)	5.31 (1.31)	5.48 (1.23)	< 0.001
Altruistic Values	5.85 (1.01)	5.32 (1.37)	5.50 (1.28)	< 0.001
Risk taking	3.27 (1.34)	3.41 (1.48)	3.36 (1.44)	0.150
Patience	4.93 (1.12)	4.57 (1.21)	4.70 (1.20)	< 0.001
General trust	3.01 (1.37)	2.93 (1.46)	2.96 (1.43)	0.446
Left-wing views	4.26 (1.19)	3.92 (1.21)	4.04 (1.21)	< 0.001

Note. This table presents the descriptive comparison of investors who did and did not revise their initial investment decision. SI = sustainable investments; SMI = stock market image.

importance, our results indicate that SFL not only competes effectively with advanced financial literacy but often explains more variance and has larger effect sizes. As a result, SFL emerges as a key correlate of investment behaviors, and should be regarded as an additional dimension in understanding these behaviors. The findings also underscore the value of considering both SFL and advanced financial literacy in future research on investment decision-making.

The causality of our findings, however, is difficult to pin down. Participants who report and display high proportions of sustainable investments might do so not because of high SFL. Instead, the reverse may be the case: their literacy could be a result of prior (sustainable) investment experience (Hastings et al., 2013; Lusardi and Mitchell, 2014), a key source of financial knowledge (Hilgert et al., 2003). If so, experienced investors should predominantly drive our main results. However, robustness checks reveal that the effect sizes of, and the differences between advanced financial literacy and SFL, are even more pronounced for non-financial market participants than for experienced financial market participants. These results suggest that the observed effects are not principally driven by prior investment experience. On the contrary, the similar results among investors and non-investors as well as in self-reported investment behavior support the conjecture that SFL is an important correlate of investment behavior.

Returning to the question of endogeneity, it is important to note that while we control for actual investment experience, financial literacy and interest are inherently linked. People are more likely to acquire and retain knowledge in areas they find engaging, and even when exposure is externally imposed, those with greater intrinsic interest absorb and apply knowledge more effectively. Thus, literacy and interest cannot be fully separated, and SFL may be both a driver and a reflection of investment engagement. More broadly, the observed relationships between SFL and investment behavior may partly reflect underlying factors such as financial interest, motivation, education, or general sophistication, which could jointly influence knowledge acquisition and investment choices. While we control for a broad set of observable characteristics, we cannot fully rule out endogeneity arising from other,

unobserved factors.

From this perspective, our results can also be interpreted as providing a detailed characterization of the types of sustainable finance knowledge and beliefs that are prevalent among individuals who engage in sustainable investing. This descriptive and predictive insight is valuable in its own right and can inform future research designs aimed at establishing causal relationships, as well as the development of targeted educational or informational interventions.

We observe smaller effect sizes and less pronounced differences in the explanatory powers of SFL and advanced financial literacy when we focus on experienced investors than on participants without financial market expertise, and when we use self-reported financial market investments as the outcome variable. These differences could be attributed to several factors. One possible explanation is the timing of real-life investments. Many investors may acquire most of their investment knowledge when they start investing. If active financial market participants gained their knowledge at a time when sustainable finance and ESG investments were less prominent, this may render SFL less important for their decisions, with general financial literacy playing a more prominent role. In contrast, for individuals who do not (yet) own stocks or are just beginning to invest, both SFL and general financial literacy are likely to be relevant, thus lending more weight to SFL. This aligns with our finding of larger effect sizes among non-financial market participants.

Our results also highlight limitations of the standard “Big Three” financial literacy questions for explaining advanced and sustainable investment behavior. In line with prior studies (e.g., Gutsche et al., 2023), we find that the Big Three exhibit a high fraction of correct responses in our prestudy sample, indicating limited discriminatory power. Moreover, the moderate correlation between basic and advanced financial literacy suggests that the Big Three capture only a narrow slice of investment-relevant knowledge. This supports the view that more advanced and domain-specific measures, such as advanced financial literacy and SFL, are better suited to explaining participation in complex and sustainable investment decisions.

A related conceptual issue concerns the relationship between general financial literacy and SFL. Financial literacy is typically designed to capture general economic and financial knowledge relevant to everyday financial decision-making, whereas SFL focuses on knowledge that is specific to sustainable investing, such as regulation and disclosure frameworks, sustainability labels, ESG investment strategies, and greenwashing risks. While general (and particularly advanced) financial literacy may facilitate the acquisition and application of SFL, our results indicate that it is not sufficient, on its own, to predict sustainable investment decisions to the same extent as SFL.

This pattern is consistent with the interpretation that SFL captures a complementary, domain-specific extension of financial literacy rather than a mere restatement of it: SFL is only moderately correlated with advanced financial literacy (AFL), with $r_s = 0.46$ in the main experiment; a combined AFL-SFL scale yields $\alpha \approx 0.69$, compared to $\alpha = 0.56$ for AFL alone; SFL loads on a separate factor in our psychometric analyses (Appendix A.5); and it retains incremental predictive power for all three investment outcomes after controlling for AFL. The negative interaction between SFL and AFL for stock market investment further indicates that SFL is particularly informative precisely where general financial sophistication is low – a pattern that would be harder to reconcile with SFL being a simple manifestation of AFL.

At the same time, we want to be explicit that this evidence, while consistent with SFL as a distinct knowledge domain, does not definitively rule out an alternative interpretation: that SFL primarily captures general financial sophistication or cognitive ability expressed within an ESG-specific content domain, in the spirit of the intersection approach of Anderson and Robinson (2022), rather than reflecting a substantively novel body of knowledge. Both interpretations would generate a broadly similar empirical signature – moderate correlation with AFL, factorial separation, and incremental predictive power – and our observational,

single-country design cannot fully adjudicate between them. We view this as an open and, in our judgment, genuinely interesting question for future research.

Why should SFL be predictive of investment behavior? Inadequate knowledge is a pertinent barrier to greater sustainable investments (Gutsche and Zwergel, 2020; Meunier and Ohadi, 2022; Wins and Zwergel, 2016). Financial literacy is related to the propensity to own stocks (Lusardi and Mitchell, 2014), potentially reflecting differences in the image that individuals have of the stock market (Dobni and Racine, 2015, 2016). Our findings support and expand upon this idea, demonstrating that SFL also relates to a more favorable view of the stock market (i.e., perceiving the stock market as less immoral) and of stockholders (i.e., not seeing them as greedy, selfish, or gambler-like; see Henkel and Pugnaghi-Zimpelmann, 2026). Although the mediation effects are modest, we find that these views are in turn associated with higher stock market investments, both in the incentivized decisions and in the self-reported financial market investments. Thus, SFL may be associated with lower stock market aversion, ambiguity, and financial disengagement (Anderson and Robinson, 2022; Antoniou et al., 2015; Kaustia and Torstila, 2011; Keller and Siegrist, 2006).

Regarding sustainable investments, barriers such as information costs (Balloch et al., 2015; Campbell, 2006), and the belief that “green” assets are usually greenwashed (“greenwashing beliefs” in short) (Degryse et al., 2023) can act as deterrents. Our findings indicate that SFL is associated with fewer greenwashing beliefs, and that greenwashing beliefs statistically mediate the relationship between SFL and both incentivized and self-reported sustainable investments. The hassle factor – the belief that sustainable investing is complicated and needs substantial time and effort – mediates the relationship between SFL and investment behavior only in self-reported outcomes, likely because the hassle factor is more relevant in real-world scenarios than in our stylized and simplified incentivized decision. Thus, SFL may, to some extent, be associated with higher levels of sustainable investment. Another channel to be investigated in future research is beliefs about risks and expected returns, as better knowledge of a specific investment product may reduce the perception of risk associated with it (Wang et al., 2011).

Regarding potentially greenwashed investments, we conjectured that greater SFL would be associated with fewer potentially greenwashed investments, consistent with a greater ability to identify greenwashed products and weaker greenwashing beliefs. The results of our mediation analyses provide indications that the association between SFL and outcomes is marginally mediated by the subjective ability to identify greenwashing, but only in self-reported behavior. Thus, the proposed mediators can explain the decrease in potentially greenwashed investments with higher SFL only to a limited extent. Nevertheless, considering the direct effects observed, increasing SFL could still enable investors to make more informed decisions and to reduce their susceptibility to greenwashing, a noted obstacle to sustainable investing (Degryse et al., 2023; Klein et al., 2022).

The participants’ response to information about greenwashing allegations against one of the funds merits further discussion. When informed about greenwashing concerns during the debriefing, more than half of the participants who invested in the potentially

greenwashed fund did not revise their initial investment decision. The reasons for this could be varied. First, investors might be engaging in information avoidance, since reassessing their decisions and considering the greenwashing information requires additional effort (Golman et al., 2017). Second, their sustainable investments might be driven by warm glow rather than by actual impact concerns (Heeb et al., 2023). Third, participants might either not believe the accusations presented or might not care about greenwashing. Finally, they might have made these investment choices for the sake of diversification, as many people believe it increases portfolio returns (Reinholtz et al., 2021). All of these reasons would explain a lower willingness to revise the decision.¹⁶ However, our results show that those participants who reported that they primarily invest sustainably in order to make an ESG impact, were more inclined to change their decisions. At the same time, we observe that the participants who revised their decision reduced the amount allocated to the greenwashed product by an average of about three quarters compared to the initial investment decision. They redirected some of these funds to the savings account but, to a greater extent, to the genuinely sustainable Fund D.

4.2. Limitations

The following limitations should be considered when interpreting our results. First, in the incentivized investment decision in the main experiment, we define potentially greenwashed investments as the proportion of total investments in the funds marketed as sustainable (Funds C and D) that are allocated to the fund that faced greenwashing allegations (Fund C). We infer that greater SFL is associated with lower potentially greenwashed investments because high-SFL investors are more likely to recognize and aim to avoid greenwashing. However, we cannot entirely dismiss the possibility that some participants may simply prefer investments in a fund with a sustainability label (Fund D), rather than explicitly and consciously aiming to avoid greenwashing. Yet, trusting sustainability labels can indeed serve as a strategy to mitigate greenwashing concerns, even without explicitly recognizing them. Nevertheless, our data show that participants who accurately identified greenwashing concerns also invested less in the fund facing greenwashing allegations. Importantly, individuals with greater SFL allocated a larger proportion of their endowment to the genuinely sustainable Fund D.

A second limitation to consider is the critique by Bethlendi et al. (2022), who argue that it may be too early to introduce the concept of SFL, as neither sustainable finance nor the EU Taxonomy are fully developed and established, leading to limited investor experience. We counter this argument by highlighting the recent surge in sustainable investments across the globe, for instance in the United States (Hartzmark and Sussman, 2019), which has exposed many investors to the practical aspects of sustainable finance and ESG investments. Moreover, in some large economic areas such as the European Union, financial advisors are now mandated to elicit clients' sustainability preferences in financial advisory, thus actively involving investors in sustainable finance considerations (Seifert et al., 2024). Furthermore, the involvement of experts in developing our inventory of SFL also

addresses this critique. Their input supports the relevance of the selected items in the current regulatory context and suggests that the inventory is likely to remain useful in the near- to medium term, although future adaptations may be necessary as sustainable finance regulation and market practice evolve.

Similar to the broader financial literacy literature (e.g., Lusardi and Mitchell, 2014; Van Rooij et al., 2011), the SFL inventory combines items assessing undisputed factual or theory-grounded knowledge with items assessing understanding of empirically grounded but potentially debated regularities. This mirrors common practice in financial literacy measurement, where respondents are assessed on stylized facts of financial markets that are not logical certainties but are relevant for informed decision-making (e.g., the higher volatility of stocks relative to bonds, or the long-run equity premium).

Relatedly, one item in our inventory (Q26) differs from the other six in that it captures a belief about a contested empirical regularity (i.e., the relative financial performance of sustainable investments) rather than institutional, regulatory, or product-related knowledge. We retain this item in our primary, preregistered measure for the reasons discussed in Appendix A.2, but we acknowledge that reasonable disagreement may exist as to whether such an item belongs in a literacy inventory in the conventional sense.

More broadly, our evidence that SFL is empirically distinguishable from advanced financial literacy – via moderate correlations, a separate factor structure, and incremental predictive power – is consistent with, but does not conclusively establish, SFL as a genuinely novel knowledge domain rather than a domain-specific expression of general financial sophistication. We discuss this open question, and how future research might resolve it, in the Discussion section above.

A third limitation involves the use of windfall gains for investment decisions in our study, which might have inflated the percentage of sustainable investments (see Hoffmann et al., 2019; but note that this concern extends to stock market investments as well; see, e.g., Briggs et al., 2021). Additionally, experimenter demand effects may have led participants to feel an implicit expectation to invest in the (sustainable) funds rather than the savings account. Both are valid concerns. However, our focus was on the relationship between SFL and investment behavior rather than on the absolute level of (sustainable) investments, and we would expect level effects to cancel out. Moreover, we observe consistent relationships between SFL and investment outcomes also in self-reported investments, where the influence of windfall gain effects is less likely. Furthermore, our use of an incentivized investment decision, designed to closely simulate investors' payoffs after one year, encourages participants to align their investment decisions and revisions with their genuine preferences rather than with perceived experimenter expectations. Finally, we did not explicitly focus the instructions on sustainable investments before participants made their investment decisions, reducing the likelihood that their decisions were influenced by the study's objectives.

5. Conclusion

Is sustainable finance literacy essential to understanding investment behavior, or are basic and advanced financial literacy measures (Lusardi and Mitchell, 2008; Van Rooij et al., 2011) sufficient, even if they do not explicitly account for sustainable finance and ESG investments? To address these questions, we developed both a short (7-item) and a long (27-item) inventory for sustainable finance literacy in the prestudy, and found a positive relationship between SFL and ownership of (sustainable) investments. In the main experiment, we confirm these findings in an incentivized experiment and find that SFL is associated with greater stock market investment, greater sustainable investment, and fewer potentially greenwashed investments. Notably, SFL explains substantial variance in these three investment behaviors even after controlling for other concepts, such as advanced financial literacy. These findings are robust to splitting the sample into financial market participants and

¹⁶ Results from a follow-up experiment ($N = 1790$), conducted using the same procedure for the investment decision (manuscript in preparation, preregistered at <https://osf.io/mgqu4/>), provide further insights into why some investors chose not to revise their decisions. Consistent with the previous findings, 60.55% of those who had invested in the potentially greenwashed fund ($N = 1019$) did not revise their investment decisions. When asked for the reasons, 25.4% stated that they did not invest in the fund for sustainability reasons, and 18.2% believed that greenwashing would not affect their financial returns, and 17.5% did not consider the allegations as greenwashing, since the fund had not been legally convicted. Other reasons included minimizing effort, lack of understanding of greenwashing, or simply not caring about the issue.

non-participants, thus partially addressing potential effects of previous investment experience, and to analyzing self-reported investment behavior, thereby increasing the external validity of our findings. SFL therefore emerges as a relevant concept: it is empirically distinguishable from general financial literacy in our data and constitutes an important correlate of investment decisions in its own right, complementing rather than substituting for advanced financial literacy. Given the strong political and regulatory interest in sustainable finance as well as the urgent need to address climate change, SFL should receive significantly greater attention in both research and policy debates on sustainable investment behavior and financial literacy. Our findings provide valuable insights for both researchers and practitioners regarding the pivotal role of SFL in investment behaviors that are relevant for discussions surrounding the transition to sustainable finance. In particular, the strong association between SFL, more sustainable investment choices, and lower exposure to potentially greenwashed products suggests SFL may be an important factor to consider when discussing how financial flows can be better aligned with climate goals.

Participants answered, on average, approximately half of the SFL questions correctly, highlighting substantial scope for improvement. From a descriptive and policy-relevant perspective, higher SFL is associated with several outcomes that are central to current debates on sustainable finance. First, higher SFL is linked to greater engagement in sustainable investments and lower exposure to potentially greenwashed products, which is relevant for discussions about directing financial flows toward genuinely sustainable investments. Second, SFL is positively associated with stock market investments in general, which may be relevant for mobilizing the private capital needed for the sustainability transition. Third, increases in sustainable investments may improve individual financial outcomes, since stock market engagement for many is beneficial for retirement savings and planning (Lusardi et al., 2017), and sustainable investments can offer both financial returns and ESG impact (Bekaert et al., 2023; Pástor et al., 2021; Von Wallis and Klein, 2015). Moreover, increased SFL might help better align investors' (sustainability) preferences with their investment choices and might make them less susceptible to misleading marketing or the absence of broadly accepted sustainability standards (Filippini et al., 2024), which is especially important for individuals with low literacy levels (Anderson and Robinson, 2022). The lower exposure to potentially greenwashed investment among individuals with higher SFL is also important because avoiding such investments can help to prevent potential negative impacts on resale values due to greenwashing accusations (Du, 2015; Gatti et al., 2021) and to foster a genuine transition towards a sustainable financial system.

Our findings indicate that SFL is strongly associated with sustainable investment behavior. While our design does not allow for causal inference, this pattern suggests that SFL may represent a relevant knowledge domain for financial education and investor support initiatives. In line with recent academic (Auzepy et al., 2026; Filippini et al., 2026) and policy discussions (OECD, 2023), financial education could be broadened to encompass SFL, enabling individuals to make more informed decisions.

Such education may also help individuals to assess whether to independently manage their investments or seek professional advice and delegate decisions, depending on their level of literacy (Holzmeister et al., 2022). Financial advisors and financial counseling services constitute a potential entry point for enhancing SFL (Carpena et al., 2017). Since the majority of retail investors' investment decisions involve financial advisors (Paetzold et al., 2015), advisors play a pivotal role in the decision-making process and support particularly individuals with low SFL levels (Stolper and Walter, 2017).

In this context, advisors could also contribute to enhancing SFL, although doing so may require appropriate incentives and additional training. By supporting informed engagement with sustainable investment products, such efforts may also affect investors' perceptions of and attitudes toward the stock market, which are important for participation

in complex financial activities such as investing (Carpena and Zia, 2020). Advisors are uniquely positioned to attract individuals otherwise hesitant about the stock market, thereby expanding stock market participation and tapping into new customer segments. Moreover, firsthand experience with sustainable investments has been shown to foster financial literacy more broadly (Hilgert et al., 2003). Future initiatives could explore whether educational interventions, potentially combined with modest financial incentives (e.g., lotteries; Bauer et al., 2022), are effective in enhancing SFL.

Our study highlights avenues for future research, demonstrating that SFL robustly relates to higher stock market investments, more sustainable investments, and better identification of a fund that faced greenwashing allegations, even among non-investors, and while controlling for advanced financial literacy. We suggest that future research on investment behavior should consider SFL as a control variable and as a relevant correlate of investment behavior. Future research could also seek to establish causal relationships between SFL and investment behavior and disentangle the underlying mechanisms in greater detail. An important unanswered question from our work is which methods are most effective for enhancing SFL. Subsequent research could evaluate the impact of different just-in-time interventions at the point of investment decision-making (Fernandes et al., 2014), such as educational materials in different formats (videos, information brochures, quizzes with feedback), which are also referred to as *educative nudges* (Kaiser et al., 2022). These interventions aim to improve literacy and downstream financial behaviors that contribute to individual and societal welfare. Future studies could also compare the effectiveness of such educative nudges with more typical nudges, such as defaults, to determine which approach more effectively promotes sustainable investment decisions (Carpena et al., 2017; Isler et al., 2022). This study lays the groundwork by elucidating the connection between SFL and investment behavior, offering valuable insights for further inquiry.

CRedit authorship contribution statement

Marcel Seifert: Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Stefan Palan:** Writing – review & editing, Resources, Methodology, Conceptualization. **Aja Ropret Homar:** Writing – review & editing, Resources, Methodology, Conceptualization. **Florian Spitzer:** Writing – review & editing, Methodology, Funding acquisition, Conceptualization. **Erich Kirchler:** Writing – review & editing, Methodology. **Katharina Gangl:** Writing – review & editing, Supervision, Resources, Project administration, Methodology, Investigation, Funding acquisition, Conceptualization.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. However, Stefan Palan provides consulting and advisory services to Raiffeisen-Landesbank Steiermark AG.

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Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.jbef.2026.101262](https://doi.org/10.1016/j.jbef.2026.101262).

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