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

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Abstract

We investigate sustainable finance literacy (SFL) as a complementary concept to general financial literacy. Study 1 uses a representative sample (N = 1,047) to develop a well-founded SFL inventory and confirms a relationship to self-reported sustainable investments. Study 2 uses an incentivized, framed field experiment (N = 1,510) to demonstrate that SFL is related to greater stock market investments and sustainable investments, and lower potentially greenwashed investments. SFL has more explanatory power than does general financial literacy. This is true for both experienced investors and non-investors. Our results underscore the pivotal theoretical and practical role of SFL for informed investments.

Keywords: Sustainable finance literacy; inventory; ESG investments; sustainable investments; stock market investments; greenwashing; incentivized; framed field experiment; preregistered;

JEL Classification: G11, G41, G53

Research highlights

- We develop a well-founded inventory to measure sustainable finance literacy (SFL)
- Greater SFL is predictive of greater sustainable investments
- SFL also predicts higher stock market investments and lower greenwashed investments
- SFL has more explanatory power than does advanced financial literacy
- The results are valid for both experienced investors and non-investors

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1. Introduction

Financial literacy is crucial for sound financial decision-making. Extensive research underscores the importance of both basic financial literacy (understanding of fundamental financial and economic principles) and advanced financial literacy (understanding of financial markets) in guiding financial decisions and stock market participation (Almenberg & Dreber, 2015; Lusardi & Mitchell, 2014; Van Rooij et al., 2011). Recently, sustainable investments that integrate Environmental, Social, and Governance (ESG) dimensions have gained relevance and have come to play a central role in achieving the United Nations' Sustainable Development Goals and the Paris Agreement (Bauer et al., 2021; Eurosif, 2018; Hartzmark & Sussman, 2019; UNDP, 2023; UNFCCC, 2018). From an investor's perspective, however, the integration of ESG considerations introduces a new layer of complexity, potentially requiring new knowledge – or literacy (Filippini et al., 2024; Löfgren & Nordblom, 2024; Pedersen et al., 2021). This raises a crucial question: Should sustainable finance literacy (SFL) be introduced as a complement to general financial literacy?

SFL encompasses an adept understanding of sustainable finance, including its fundamental terms, regulatory frameworks, products, investment strategies and performance, and potential impact on ESG factors and the economy. While widely used concepts and therefore inventories for basic financial literacy by Lusardi and Mitchell (2008) and for advanced financial literacy by Van Rooij et al. (2011) exist, this is not the case for SFL. Among the available definitions and measures of SFL (Degryse et al., 2023; Strauß et al., 2023; Yucel et al., 2023), only few were developed using a stringent scientific approach, for example the one from Filippini et al. (2024), in which SFL is assessed with a set of multiple-choice questions. Consequently, there are few empirical studies on SFL, and the theoretical and practical relevance of SFL compared to general financial literacy remains unclear.

Significant gaps also prevail in our understanding of the relationship between SFL and broader financial behaviors, including not only sustainable or greenwashed investments, but also stock market participation more generally. Greater SFL can be expected to be associated with more sustainable investments, because SFL reduces information barriers (Filippini et al., 2024; Gutsche et al., 2023; Wins & Zwergel, 2016), misperceptions (Meunier & Ohadi, 2022) and perceived information costs, which

are significant factors in investment behavior (Balloch et al., 2015; Campbell, 2006; Meunier & Ohadi, 2022). The lack of SFL might impair the translation of sustainability preferences into investment decisions, especially for individuals with lower financial literacy (Anderson & Robinson, 2022). However, empirical evidence on the relationship between SFL and sustainable investments is mixed. One study based on Eurobarometer data of 30.000 participants reports no significant relationship between participants' SFL and their intention to invest in sustainable products (Olumekor & Oke, 2024). In contrast, two other studies, based on data from the US and UK (Meunier & Ohadi, 2022) and from Switzerland (Filippini et al., 2024), respectively find that SFL is related to self-reported sustainable investments.

Greater SFL can also be expected to be associated with fewer potentially greenwashed investments and a greater ability to distinguish between truly green investments and assets that are only marketed as being green (i.e., "greenwashed" assets, cf. Gatti et al., 2021; Kleffel & Muck, 2023). In the investment domain, prior research suggests that product names can be used to mislead investors (Anderson & Robinson, 2022; Cooper et al., 2005), a practice that could be countered by SFL. By raising awareness for potential greenwashing issues, SFL could allow investors to recognize misleading information. Studies in non-investment related domains show that literacy interventions enable consumers to differentiate between genuinely green and greenwashed products (Fernandes et al., 2020).

Greater SFL might 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 & Racine, 2015, 2016) and of stockholders (Henkel & Zimpelmann, 2023). Similarly, SFL might mitigate stock market aversion (Kaur & Vohra, 2012; Kaustia & Torstila, 2011; Keller & Siegrist, 2006) and attract ethically-minded individuals who would otherwise shy away from the market (Brunen & Laubach, 2022). Briere and Ramelli (2021) report that offering sustainable investment options in French employee savings plans increases employees' equity investments.

This paper addresses two research questions arising from the gaps in the literature. First, how does SFL relate to financial decisions, such as stock market investments in general, sustainable investments, and

greenwashed investments? Second, is SFL the same as, part of, or a complement to basic and advanced financial literacy? Answering these questions will allow us to determine the theoretical and practical importance of the emerging concept of SFL on its own as well as relative to other financial literacy concepts. To study our questions, we deliberately chose Austria. As a country within the European Union, Austria offers a rich context with its established sustainability regulations and frameworks, such as the EU Taxonomy, and its state-issued sustainability label for finance products, the Austrian Eco-Label (UZ49). Additionally, this setting facilitates the development of an SFL inventory that can be adapted and expanded for use in different international contexts.

To address our research questions, we conducted two preregistered and ethics approved survey studies.[1] In Study 1, we developed a brief inventory to measure SFL. Our choice of items was based on the literature, existing measures, three rounds of systematic consultations with 12 financial experts, and on statistical analyses (exploratory and confirmatory factor analyses, analysis of discrimination, difficulty, homogeneity) of data from a representative sample (N = 1,047). We furthermore used Study 1 to confirm previous studies that show that SFL is related to self-reported sustainable investments. We find that SFL and advanced financial literacy are two relevant predictors of participants' self-reported investments in financial markets in general and in sustainable assets in particular.

In Study 2, we investigate whether SFL is predictive of stock market investments, sustainable investments, and potentially greenwashed investments in 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 = 1,510), we asked participants to allocate 500 euros across a savings account and four different mutual funds – two traditional funds, one sustainable fund, and one fund that is marketed as sustainable faced greenwashing allegations and changed its

[1] Preregistered at Open Science Framework (OSF): https://osf.io/ycu3x (Study 1) and https://osf.io/ejzr7 (Study 2). We marginally deviate from the preregistrations. In Study 1, 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. Both in Study 1 and Study 2, we include household income as a binary variable using a median split (low vs. high) to allow for easier interpretation. The procedures were approved by the Ethics Committee of the Institute for Advanced Studies (Case 05, 05.06.2023; Case 12, 09.10.2023).

marketing messaging as a result. By contrasting the effect sizes and explained variance of SFL with advanced financial literacy (Balloch et al., 2015; Van Rooij et al., 2011), we sought to determine SFL's unique explanatory power in shaping investment decisions. We did so while controlling for several other variables that may be related to investment decisions, e.g., 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 revise their investment decision, which then determined their final pay-off.

Study 2 shows that SFL is robustly associated with higher stock market investments, more sustainable investments and less potentially greenwashed investments in a German-speaking sample. While SFL and advanced financial literacy correlate, SFL is associated with greater effect sizes and additional variance explained in the three incentivized outcome variables. We show that these results are robust to several specifications, and remain qualitatively similar when replicated with self-reported investment behavior outside of the experiment. We furthermore find similar effects of SFL among financial market participants and non-financial market participants, indicating that investment experience is not a major driver of our findings (Hastings et al., 2013; Lusardi & 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 does not adjust their investments. Those who do shift investments towards the genuinely sustainable fund and the savings account but not towards conventional funds.

Our findings contribute to several strands of literature. First, we complement prior research on the measurement of financial literacy which to date has rarely included ESG aspects (Balloch et al., 2015; Lusardi & Mitchell, 2008; Van Rooij et al., 2011). Additionally, we enrich the emerging literatures on sustainable finance and on financial literacy by developing an inventory to measure an individual's level 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 use in future studies, allowing researchers to identify potential relationships between SFL and, e.g., pro-environmental or financial behaviors.

Second, our findings add to the literature on the interplay between financial literacy and broader investment behavior. We identify SFL as a key determinant of stock market investments and sustainable investments. Particularly, we go beyond previous 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 the first to study the effects of SFL on incentivized investment decisions, controlling for advanced 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 & Muck, 2023; Klein et al., 2022), which has recently received increased attention among regulators (see, e.g., European Banking Authority, 2023). As a novelty compared to related studies (Degryse et al., 2023; Filippini et al., 2024), we are the first to show that greater SFL is associated with lower potentially greenwashed investments. Giving investors the choice of investing, as one option, into a fund that has actually faced greenwashing allegations, represents a methodological contribution to the literature. The lack of revision in investment decisions despite greenwashing allegations aligns with other studies indicating that the willingness to pay for impact of ESG investments does not scale with the absolute level of impact (Heeb et al., 2023). These findings suggests that investors may be driven by warm glow rather than actual ESG impact.

In terms of practical implications, our results show that SFL, through its association with investment behavior, might be a prominent factor to study when aiming to increase individual and societal welfare. In particular, stock market participation is linked to financial wellbeing and retirement provision (Bucher-Koenen et al., 2021; Lusardi & Mitchell, 2014), and sustainable investments are relevant for societal welfare (Hong et al., 2023) and the sustainability transition (e.g., European Commission, 2024, Eurosif, 2018). Being able to identify greenwashing, finally, is important for informed financial decision-making, since it reduces an investor's vulnerability to being misled, allowing them to avoid products that do not align with their sustainability preferences or that in the future face greenwashing allegations, which may lead to lower resale values (Du, 2015; Gatti et al., 2021). Measuring SFL with a brief inventory will allow practitioners (e.g., financial advisors) to tailor their advice to investors' SFL

levels. In addition, measuring SFL provides policymakers with the possibility to evaluate and inform financial literacy strategies.

2. Measuring SFL and predictions of self-reported investment behavior (Study 1)

The goal of our first study is twofold. First, we develop a short inventory to measure SFL. Second, we investigate its relationship with the self-reported ownership of (sustainable) investment products. We particularly focus on assessing SFL's importance relative to other concepts such as basic and advanced financial literacy as well as sustainability literacy, i.e., knowledge about sustainability in general. This section starts by discussing how we developed our SFL questionnaire. We proceed by describing all items we elicited. Appendix C presents the questionnaire.

2.1. Method

We undertook several steps to develop and select SFL questions that cover the topic of sustainable finance comprehensively and are relevant for practice. These steps included consulting the literature and 12 experienced experts, as well as conducting qualitative pre-tests and a quantitative data collection, as detailed in the following sections.

2.1.1. Development of the SFL question pool

We base our questions on the previous literature and on existing SFL measures used in sustainable finance (Degryse et al., 2023; Filippini et al., 2024; Klein et al., 2022; Meunier & Ohadi, 2022), on industry reports (HSBC, 2020), on various learning materials from the Austrian Federal Ministry for Climate Action, and on questions used in online quizzes on sustainable finance (e.g., by UBS). Three co-authors of the paper independently developed questions taking the form of true or false statements to measure SFL, resulting in 73 different questions (in German). Through an iterative process, the question set was refined from 73 to 30 question by eliminating duplicates, consolidating similar questions, and discussing the relevance of the questions among the researchers, aiming to produce questions that evoke neither positive nor negative feelings or beliefs about the topic. These questions fell into eight categories: definitions, regulation, greenwashing, investment strategies, financial market

products, ESG impact, financial performance, and sustainable financial products.[2] The set of 30 questions was then presented to 12 experienced experts from 9 institutions, including the Austrian Financial Market Authority and the Green Finance Department of the Environment Agency Austria, who rated the questions on relevance (1 = not relevant, 5 = very relevant), and commented on their comprehensibility, content, and precision (Table A.1 in the Appendix provides an overview of all institutions and review rounds). The expert feedback ensured the relevance, robustness and correctness of the concepts covered, as well as the near- to mid-term validity of the statements in the context of forthcoming regulations or changes in regulations. We used a pretest, based on ratings of 10 researchers in economics and economic psychology to make small refinements concerning clarity and comprehensibility. The statements presented in the questions were true in 20 questions and false in 10 questions. The predominance of true questions increases comprehensibility, whereas the inclusion of false questions ensures necessary variation in answering patterns. We provide detailed information about the 30 questions, including English translations and the description of the translation process in Table A.2 in the Appendix.

2.1.2. Measured variables

SFL, basic and advanced financial literacy, and sustainability literacy. We included our 30 SFL questions in the survey with the aim of developing a shorter inventory with a reduced number of questions. To allow for factor analyses later in the data collection process, all 30 questions shared the same scale, i.e., responses to the question "How likely is this statement true or false", collected on a 5-point Likert-scale, with the labels 1 = definitely false, 2 = likely false, 3 = undecided, 4 = likely true, 5 = definitely true, plus the option of answering "I do not know". To compare SFL to other concepts, we measured basic financial literacy (three questions; Lusardi and Mitchell, 2008), advanced financial literacy (three questions, van Rooij et al., 2011), and sustainability literacy (three questions, based on Filippini et al., 2024). All four literacy measures were scaled to a range from 0 to 1. We also measured

[2] Our design considers all three ESG factors. However, to simplify the terminology, we use the term "greenwashing", as it is more commonly used than, e.g., "bluewashing", which focuses on social aspects.

subjective basic and advanced financial literacy, subjective SFL, and subjective sustainability literacy (Brunen & Laubach, 2022; Dobni & Racine, 2015; Gutsche et al., 2023).

Self-reported investment behavior. We asked participants to indicate what type of investments they own (e.g., savings account, cash, stocks, bonds, funds). Participants who owned stocks, bonds, or funds were categorized as financial market participants (0 = no, 1 = yes). We assessed self-reported sustainable investments by asking participants whether they hold sustainable investments and categorized those holding sustainable stocks, bonds, or funds as sustainable financial market participants.

Explanatory and other variables. As further control variables analyzing the determinants of (sustainable) investment behavior, we measured the hassle factor, i.e., the perception that (sustainable) investing is complicated (Sivaramakrishnan et al., 2016), financial experiences and behaviors, environmental attitudes (derived from van der Werff et al., 2013) and behaviors (Heeb et al., 2023), and sociodemographic characteristics (gender, age, income).

2.1.3. Participants

We commissioned an international market research agency (TalkOnline Panel GmbH) to collect data from a representative sample for Austria with quotas for age (above 18 years) and gender in March 2023. This sample (N = 1,047) consisted of 51.00% women and had an average age of 49.38 years (SD = 17.09). Overall, 32.95% of the respondents reported having a university degree, which is higher than the Austrian average of 15.30%. The median net household income (*Median* = 4.0, corresponding to 3,001 to 4,000 euros) was slightly higher than the median net household income of 2,879 euros in Austria in 2022 (Statistics Austria, 2023). A total of 43.84% of the participants were financial market participants, defined by current ownership of funds, stocks, or bonds, and about 25% of the full sample also owned sustainable financial market products. The sample covered a wide range of investment experiences, ranging from no experience (40.69%) to our top category of more than eleven years of experience (19.58%). The sample size of 33 participants per question exceeds even the most conservative rule of thumb for scale development, which is 20:1 participants per question of the inventory (Morgado et al., 2017).

2.1.4. Procedure

Participants who accepted our invitation to a study on investment decisions were directed to the online survey (in German) on the survey platform *Limesurvey*, where they first received general instructions and accepted the terms of participation and the privacy policy. The survey consisted of nine sections. We presented the questions on (sustainable) finance literacy and sustainability literacy in random order. Participants received a standard participation fee through the market research agency and the median participant took 11.9 minutes to complete the survey.

2.2. Results

2.2.1. Development of the SFL inventory (Study 1)

To assess the suitability of our items, we analyze the discrimination index (i.e., how well the item can discriminate between participants with low and high knowledge) and the difficulty index (also called item easiness, i.e., how challenging an item is for the participants) of all questions (Ebel & Frisbie, 1972; Gronlund & Linn, 1990). Of the 30 SFL questions (more details in Appendix A.2, Table A.3), three questions (Q9, Q21, Q23) have a discrimination index below 0.19. Scores below 0.20 indicate that questions do not reliably discriminate between high and low overall scores, i.e., between participants with low and high SFL. These three questions furthermore had low difficulty indices (i.e., too low item easiness), suggesting that they are too difficult to answer, thus making them candidates for deletion. The remaining 27 questions are suitably discriminative, with an appropriate difficulty level.

To develop a shorter version of the inventory (Table 1), we selected the three "true" questions (5, 16, 12) and the two "false" questions (26, 19) with the highest discrimination indices, and added two additional questions (3, 4) that were considered important by the external experts (expert ratings are shown in Table A.3. in the Appendix). We further grounded the selection of questions for the short inventory in the exploratory factor analysis by including questions with high factor loadings (Appendix A.3). The seven-question inventory includes two country-specific questions regarding regulations within the European Union and the Austrian Eco-Label for use in Austria. For additional benefits in the

measurement, we would recommend adapting to local circumstances when the short inventory is used in other locales (Q4 is Austria-specific and Q5 is EU-specific).[3]

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

	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, or index funds and 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 translated versions of the seven questions included in the short version of the inventory.

The reliability of this seven-item inventory is Cronbach $\alpha = 0.62$ (the five "true" questions have a reliability of $\alpha = 0.72$). The descriptive characteristics ($M = 3.68$; $SD = 1.11$; Median = 4.00,

[3] For international use (i.e., outside of Austria / the European Union), we additionally provide a 5-question measure omitting two country-specific questions. These can also be omitted or adapted to the local contexts, e.g., by replacing the Austrian Ecolabel in Q4 with a label used in the target country. Table B.10 in the Appendix presents the primary analyses from Study 2 using the 5-question inventory, revealing comparable effect sizes to those observed with the 7-question inventory.

Kurtosis = -0.34) indicate that the instrument is suitable for reliably assessing SFL. The seven-items inventory also provides a comparably good measurement of SFL as the 27-items version, since the correlation between the results of both inventories is very high (Spearman's Rho $r_s = 0.87$, $p < 0.001$).

Participants on average answered 3.5 out of 7 (*Median* = 4) SFL questions correctly ($M = 0.51$, $SD = 0.27$, i.e., 51% of the 7 questions). Table A.5 reports the share of correct responses to each of the 30 questions; Table B.2 shows the number of correct responses in Study 1 and Study 2 for the short inventory. Of the basic financial literacy questions, participants answer an average of 2.11 out of 3 correctly (*Median* = 2; in percentage terms: $M = 0.70$, $SD = 0.30$), of the advanced financial literacy questions 2.2 out of 3 (*Median* = 2; $M = 0.72$, $SD = 0.32$), and of the sustainability literacy questions 1.17 out of 3 (*Median* = 1; $M = 0.39$, $SD = 0.25$). SFL correlates positively with basic financial literacy ($r_s = 0.33$, $p < 0.001$), advanced financial literacy ($r_s = 0.39$, $p < 0.001$), and sustainability literacy ($r_s = 0.25$, $p < 0.001$).

Regarding internal validity, Table 2 shows that the results of the 7-items inventory are positively correlated with basic and advanced financial literacy (both subjective and objective), sustainability literacy, investment experience, education in economics, and ownership of (sustainable) investment products.

2.2.2. Confirmatory factor analysis

A confirmatory factor analysis (CFA) using the data collected in Study 2 reveals that all items consistently measure a single underlying concept, confirming SFL as a homogeneous construct. The CFA indicates an acceptable fit (Hu & Bentler, 1999), with a Root mean Square Error of Approximation (RSMEA = 0.07) and a Standard Root Mean Residual (SRMR = 0.04) that remain below the recommended cut-off of 0.08. The Comparative Fit Index (CFI = 0.91) is above the acceptable cut-off of 0.90, while the Tucker-Lewis-Index (TLI = 0.86) falls slightly short of the acceptable cut-off of 0.90. The model's Chi-Square test is significant (Chi-square(14) = 120.19; $p < 0.001$), which, however, is common with larger samples. Modeling the true and false questions as two separate factors to account for the factor structure found in the exploratory factor analysis (Table A.4) results in a good fit (RMSEA = 0.04, SRMR = 0.03, CFI = 0.97, TLI = 0.95), except for the Chi-square(13) = 49.60, $p < 0.001$.

Table 2. Correlation of SFL with related concepts.

	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1.SFL (7 questions)	0.51 (0.27)															
2.SFL (27 questions)	0.50 (0.22)	0.87														
3.SFL (5 questions)	0.48 (0.28)	0.92	0.78													
4.Basic FL	0.70 (0.30)	0.33	0.35	0.34												
5.Advanced FL	0.72 (0.32)	0.39	0.41	0.41	0.48											
6. Sustaina-bility literacy	0.39 (0.25)	0.25	0.27	0.24	0.24	0.27										
7.Subjective SFL	0.40 (0.24)	0.30	0.35	0.26	0.21	0.23	0.12									
8.Subjective basic FL	0.55 (0.22)	0.31	0.37	0.28	0.26	0.28	0.12	0.64								
9.Subjective advanced FL	0.44 (0.22)	0.33	0.38	0.30	0.25	0.29	0.09	0.76	0.74							
10.Subjective sustainability literacy	0.54 (0.22)	0.28	0.32	0.25	0.18	0.19	0.22	0.54	0.50	0.44						
11. Investment experience	2.65 (2.75)	0.27	0.33	0.27	0.28	0.34	0.07	0.38	0.36	0.49	0.16					
12. Education	4.75 (1.96)	0.18	0.20	0.19	0.12	0.15	0.20	0.17	0.21	0.21	0.24	0.16				
13. Education in economics	2.65 (1.08)	0.21	0.24	0.20	0.22	0.21	0.09	0.32	0.42	0.42	0.22	0.28	0.21			
14. Financial market participant	0.44 (0.50)	0.28	0.29	0.29	0.31	0.33	0.14	0.32	0.30	0.41	0.15	0.61	0.16	0.19		
15. Sustainable financial market participant	0.25 (0.43)	0.22	0.25	0.22	0.17	0.20	0.13	0.34	0.20	0.31	0.19	0.41	0.10	0.14	0.58	

Note. This table presents the correlations between measures of SFL and related concepts of financial literacy (FL). *M* = mean, *SD* = standard deviation. All correlations computed using Spearman's Rho. Correlations with $r_s > 0.10$ are significant at $p < 0.001$, correlations below this threshold are significant at least at $p < 0.05$.

2.2.3. Sustainable finance literacy and self-reported investment behavior

To test for the relationship of SFL with self-reported investment behavior, we calculated logistic regression analyses (Table A.6 in the Appendix) based on the sample of Study 1. The results show that both SFL and advanced financial literacy increase the likelihoods of being a financial market participant and of holding sustainable investments. Basic financial literacy relates only to financial market investments, but not strongly to holding ESG investments. Sustainability literacy does not significantly

relate to either outcome variable. Thus, to determine the relative relevance of SFL for investment behavior, it should be compared to advanced financial literacy.

2.3. Discussion

Study 1 aimed at developing an inventory to assess SFL and to investigate its relevance relative to other concepts of financial literacy in incentivized and self-reported investment behavior. Our analyses suggest a 7-question short inventory to assess SFL. However, as all questions load on one factor (except for the "false" questions) and have sufficient discriminatory power, the 27-question long measure or other short versions such as the 5-question inventory could similarly be used to measure SFL. The results indicate that SFL correlates highly with self-reported ownership of (sustainable) investment products. Overall, among the other concepts, advanced financial literacy can explain these outcome variables to a similar degree, while basic financial literacy and sustainability literacy displayed less explanatory power. Thus, in Study 2 we focus on the effect sizes of SFL and advanced financial literacy.

3. The importance of SFL for investment behavior (Study 2)

Study 2 investigates whether SFL drives stock market investments, sustainable investments, and potentially greenwashed investments, with the aim of studying the relevance of SFL relative to that of advanced financial literacy, both in incentivized and in self-reported investment decisions. To this end, we conducted a framed field experiment including an incentivized investment decision (as per Gutsche et al., 2023). The questionnaire is reproduced in Appendix D.

3.1. Method

3.1.1. Measured variables

Incentivized investment decision. Our three main outcome variables related to 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).[4]

Participants allocated 500 euros to four funds and a savings account. This design extends the decision space of previous studies like Gutsche et al., 2023 and Seifert et al., 2024 by allowing investments in a risk-free savings account (as in Kleffel and Muck, 2023). Figure 1 shows the options: two conventional funds without a sustainability objective (Funds A and B), one sustainable fund (Fund D), one sustainably marketed but potentially greenwashed fund (Fund C) and a savings account. Fund C was a historical example of documented greenwashing allegations against an investment fund.[5] We discussed this procedure and the fund selection (Appendix B.1) with the Austrian Financial Market Authority (FMA) and the Consumer Advocacy Austria (VKI). The funds were identical in terms of the risk and performance information we provided to the participants, but differed in ESG considerations and economic sectors (as per Seifert et al., 2024). Most sustainability ratings of the allegedly greenwashed fund are similar to those of the conventional funds. Fund names were not made explicit to ensure that decisions were based solely on the provided information. In line with other experiments (Gutsche et al., 2023; Heeb et al., 2023; Lagerkvist et al., 2020), we limited information to avoid overload and to keep the experiment reasonably short. We used information that is usually accessible to retail investors (e.g., MSCI or Cleanvest ratings), rather than non-public rating sources (like the Refinitiv EIKON ESG rating), which are typically available only to institutional investors.

[4] 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.

[5] 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/pressemeldungen/presse-bw/klage-gegen-dws-wegen-greenwashing-78104. German report on cease-and-desist declaration: https://www.ecoreporter.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/.

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 them again with the funds in Figure 1, we measured stock market investments, sustainable investments and potentially greenwashed investments in the revised decision. This procedure allowed us to calculate the differences in the three outcome variables as well as in the amounts allocated to each of the products before and after learning about the greenwashing allegations.

Self-reported investment behavior. We elicited self-reported investment behavior for financial market investments, sustainable investments, and potentially greenwashed investments. For self-reported financial market investments, participants indicated whether they own financial assets such as stocks, bonds or funds and the total amount of financial products relative to their overall wealth (1 = *1 to 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, funds* in this question. For self-reported sustainable investments, participants reported the percent share of sustainable assets among their financial assets (stocks, bonds, funds) in a single choice question (1 = *0% - I do not own sustainable assets*, 2 = *1 to 24%*, 3 = *51 – 75%*, 4 = *76 – 99%*, 5 = *100% - I only own sustainable assets*). For self-reported greenwashed investments, we used a proxy question, since investors are likely often unaware of owning a greenwashed product (*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);* anchored at 1 = *always*, 5 = *never* (reversed)).

Figure 1. Incentivized investment decision, as presented to the participants

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 fond volume in %)	Galp Energia (6,5%) USD Cash (4,38%) Ovinitiv 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%) Respol (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 Environment (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%)	-

Note. This figure shows the four equity mutual funds and the savings account used in the investment decision (English translation).

Follow-up questions and attention check. We included two follow-up questions concerning the investment products' properties. The first question measured participants' sustainability rating of each product (7-point Likert scale, anchored at 1 = not at all sustainable, 7 = very sustainable). The second question asked which of the funds they thought was most likely to be engaging in greenwashing, providing answer options for each fund and a "none" choice. This generated a binary variable for correctly identifying the potentially greenwashed product.[6] An attention check was randomly included among the SFL questions ("*Please choose "false" here*). Participants failing the check were excluded and replaced (N = 134).

SFL, advanced financial literacy, and other explanatory variables. In the postexperiment survey, we measured our main explanatory variable SFL using the 7-question inventory developed in Study 1

[6] 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.

with a true/false answer format plus an "I don't know" answer option. SFL is the sum of correct responses to the seven questions, scaled to a range from 0 to 1. We include advanced financial literacy, measured by three questions, with the total number of correct answers again scaled to a range from 0 to 1, as the second most important explanatory variable (Balloch et al., 2015; Lusardi & Mitchell, 2014; Van Rooij et al., 2011). We collected further control variables that are related to investment decisions: stock market image (i.e., what views participants have about the stock market in terms of wealth creating capacity, immorality, and the importance of ESG factors; Dobni & Racine, 2015, 2016; Jeong et al., 2014), stockholder image (i.e., whether participants view stockholders as greedy, selfish, or gambler-like; Henkel & Zimpelmann, 2023), hassle factor (i.e., the perception that investing sustainably is complicated; Sivaramakrishnan et al., 2016), beliefs that sustainable investments are greenwashing (Degryse et al., 2023), biospheric and altruistic value orientation (i.e., caring for an intact environment and for others' utility; De Groot & Steg, 2007, 2008), risk taking (Dohmen et al., 2011; Henkel & Zimpelmann, 2023), patience (Falk et al., 2018; Gutsche et al., 2023), general trust (Balloch et al., 2015; Guiso et al., 2008; Nilsson, 2008), political orientation (Kaustia & Torstila, 2011) as well as socio-demographics (gender, age, household income, education). We furthermore collected reasons for ESG investments (financial or non-financial) and the subjective ability to identify greenwashing (inspired by Degryse et al., 2023).

3.1.2. Participants

We recruited a sample of 1,510 participants, representative of the Austrian population in terms of age above 18 years, gender, and university degree, via an internationally operating market research agency (TalkOnline Panel GmbH) between 25.10.2023 and 08.11.2023.[7] The sample consisted of 51.20% women and had an average age of 49.03 years (SD = 16.92). 15.30% reported having a university degree. Our sample's median net household income ($Median$ = 4.0, equal to 3,001 to 4,000 euros) was slightly higher than Austria's median net household income of 2,879 euros in 2022 (Statistics Austria, 2023). 43.31% of the participants reported being financial market participants, defined by ownership of

[7] We implemented quotas for participants with university degree, as the sample in Study 1 included a higher proportion of participants with a university degree compared to the Austrian population. We excluded three of the initially 1,513 complete responses due to repeated participation.

funds, stocks, or bonds, with 30.72% of the total sample owning sustainable investments. Investment-related experience ranged from none (50.20%) to our top category of more than eleven years (15.96%).

3.1.3. Procedure and incentives

We started the framed field experiment by informing participants about the monetary incentives. Five participants were to be randomly selected in a lottery draw. For these participants, we invested the amount allocated to each fund or the savings account and promised them to sell the funds after one year and pay out to them the resulting ending values (as in Gutsche et al., 2023 and Seifert et al., 2024). The first part of the experiment mimicked a financial advisory setting. Participants were asked to imagine themselves going to a bank to invest 500 euros and then make the incentivized investment decision. In the next part of the experiment, we measured SFL, advanced financial literacy, further control variables as well as other investment-related variables. Follow-up questions concerning the properties of the investment products were asked towards the end to avoid unwanted spillover effects affecting other questions, in particular the perception of greenwashing. In the final part, we debriefed the participants about the greenwashing allegations against Fund C and that these had led to changes in its marketing claims. They could then revise their investment decision. Their revised allocation formed the basis of what will be paid out to the winners of the draw.[8] The participants received a link to SFL training materials and were asked to leave their email for the lottery. They received a standard participation fee from the market research agency. The median participant spent 12.24 minutes on the experiment.

3.2. Results

The descriptive results in Table 3 show that participants invest an average of 354.65 euros of the total endowment of 500 euros (i.e., 70.9%) in the stock market and save the remaining 145.35 euros (i.e., 29.1%). Investments in the funds marketed as sustainable account for 48.1% of the amount invested in all funds. Participants who invested in the sustainably marketed funds (N = 1,081) invested 43.5% into

[8] 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.

the fund confronted with greenwashing allegations. Participants invested significantly more into Fund D ($p < 0.001$) than would be predicted by a 1/n or naïve-diversification strategy, which would entail investing equal amounts into each fund or product (Benartzi & Thaler, 2001). These results point towards a preference for sustainable investments. The first follow-up question shows that participants were able to identify Fund D as the most sustainable among the funds. 27.59% correctly identified the potentially greenwashed product in the second follow-up question, while 26.65% indicated that none of the products was likely to have been greenwashed.[9]

After the debriefing and thus after learning about the greenwashing allegations against one fund, a majority of participants (67.90%) who had invested into the sustainably marketed funds ($N = 1{,}081$) did not revise their investment decisions, even though 72.75% of them had allocated a positive amount to Fund C. Those who revised their allocations reduced their investment in the allegedly greenwashed fund by approximately 70%. They shifted their investments towards the genuinely sustainable fund, increasing their initial investment in this fund by 51.07%, and, to a lesser extent, to the savings account increasing their initial investment by 22.04%. Appendix B.8. presents a more detailed analysis of the revised investment decisions and the determinants of revising the decision.

Participants on average answered 49.09% (SD = 27.89%; $Median = 4$) of the seven SFL questions correctly, which aligns with the average of Study 1 (U-test, p = 0.168). Table B.2 in the Appendix presents a detailed comparison of correct responses per SFL question between Studies 1 and 2. On average, participants answered 2 out of 3 advanced financial literacy questions correctly ($Median = 2$; $M = 0.66$, $SD = 0.33$; U-test; $p < 0.001$). As in Study 1, SFL correlates with advanced financial literacy ($r_s = 0.46$, $p < 0.001$). Table B.3 in the Appendix relates SFL and answering each of the seven SFL

[9] Although the percentage of correct identification is relatively low, we argue that it was not due to chance. First, participants were aware of the meaning of greenwashing, as we defined it in the question text of the second follow up question. Second, the ability to correctly identify the potentially greenwashed fund is related to higher SFL (Table 7). Third, identification was more prevalent among participants with a university degree ($r_s = 0.11$, $p < 0.001$), among those with a greater belief that "green" assets are usually greenwashed ($r_s = 0.07$, $p < 0.01$), and those experiencing a lower hassle factor ($r_s = -0.08$, $p < 0.01$). Of all participants, 18.23% indicated that the sustainable Fund was likely greenwashed, while 12.36% and 17.17%, respectively, selected Funds A or B. One explanation for the moderate identification rate might be the complexity of the task, particularly for those with low SFL.

items correctly with investment behavior and with the identification of potential greenwashing. Correlations show, for example, that participants who correctly answered the question on the meaning of greenwashing (Q3) were more likely to correctly identify the allegedly greenwashed fund in the follow-up question, and less likely to state that none of the funds represented a case of greenwashing. We present the descriptive statistics of all explanatory variables included in the subsequent regression models in Table B.4.

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

Outcome variable	*N*	*M*	*SD*	*Min*	*Max*
Stock market investments (% of endowment)	1,510	70.9%	35.0%	0%	100%
ESG investments (% of stock market investment)	1,510	48.1%	37.7%	0%	100%
Potentially greenwashed investment (% of ESG)	1,081	43.5%	30.3%	0%	100%
Investment Fund A	1,510	€81.76	€113.44	€0	€500
Investment Fund B	1,510	€74.39	€107.18	€0	€500
Investment Fund C	1,510	€83.20	€104.08	€0	€500
Investment Fund D	1,510	€115.30	€132.90	€0	€500
Investment savings account	1,510	€145.35	€174.93	€0	€500
Sustainability rating Fund A	1,510	3.16	1.50	1	7
Sustainability rating Fund B	1,510	2.96	1.51	1	7
Sustainability rating Fund C	1,510	4.43	1.47	1	7
Sustainability rating Fund D	1,510	4.88	1.36	1	7
Sustainability rating savings account	1,510	3.98	1.68	1	7
Greenwashing correctly identified	1,497	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. Since we exclude participants who did not invest sustainably (*N* = 429) from the analyses of potentially greenwashed investment in Table 6, we report data for this subsample only (*N* = 1,081). The greenwashing identification question was mistakenly not mandatory in our survey software. Thus, we miss *N* = 13 responses. Note that participants judged the sustainability ratings of the funds while seeing all fund details (Figure 1) which might have affected their ratings. Percentages of the outcome variables on investments do not always perfectly align with the values in euros, since we record zero sustainable investments for participants who did not invest in the stock market, as described in Section 3.1.1.

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

3.2.1. SFL is associated with greater stock market investment

To test whether SFL predicts stock market investment (*H1*), we use an econometric model regressing stock market investment on SFL (Table 4). We successively add control variables, yielding four hierarchical models. Model (1) regresses stock market investments on advanced financial literacy, Model (2) regresses on SFL, Model (3) regresses on both and Model (4) adds further control variables. The full hierarchical models are in Table B.5 in the Appendix; gender-specific analyses are in Table B.11.

We find that SFL relates to an increase in stock market investments of 36.61 percentage points [95% CI: 0.31; 0.43] in Model (2), and to one of 18.7 percentage points [95% CI: 0.12; 0.26] in Model (4). Advanced financial literacy relates to an increase in stock market investments of 24.31 percentage points [95% CI: 0.19; 0.29] in Model (1), and one of 8.4 percentage points [95% CI: 0.03; 0.14] in Model (4). Wald tests show that the coefficients for SFL are significantly higher than those for advanced financial literacy in Model (3) ($F(1507, 1) = 9.27$, $p = 0.002$), whereas the difference is only weakly significant in Model (4) ($F(1507, 1) = 3.70$, $p = 0.054$). Hierarchical regression analyses show that Model (1) accounts for $R^2 = 0.053$ of total variance, and Model (3) accounts for $R^2 = 0.087$, which is a significant increase due to the inclusion of SFL (ΔR^2: $F(1507,1) = 2.139$, $p < 0.001$).

Overall, the results show that SFL is more important than advanced financial literacy in explaining stock market investments and explains this behavior even after controlling for advanced financial literacy. Similar to Cronqvist et al. (2015), we investigate potential mechanisms via a mediation analysis (see Appendix B.4. for a detailed analysis). We find that the relationship between SFL and stock market investments is weakly mediated by a more positive image both of the stock market (i.e., in terms of morality and wealth creating capacity) and of stockholder characteristics (i.e., greedy, selfish, gambler-like).

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

	(1)	(2)	(3)	(4)
Sustainable finance literacy		0.366***	0.294***	0.187***
		(0.031)	(0.035)	(0.035)
Advanced financial literacy	0.243***		0.128***	0.084**

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

	(1)	(2)	(3)	(4)
	(0.026)		(0.029)	(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***	0.530***	0.480***	0.462***
	(0.019)	(0.017)	(0.021)	(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, successively adding control variables. Additional control variables in Model 4: Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. Standard errors are shown in parentheses. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.2.2. SFL is associated with greater sustainable investment

To test whether SFL predicts sustainable investment (*H2*), we use the same model specifications as in Table 4, with sustainable investments as the outcome 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 percentage points [95% CI: 0.26; 0.39] in Model (2), and one of 25.1 percentage points [95% CI: 0.17; 0.33] in Model (4). Advanced financial literacy relates to a significant increase of 15.49 percentage points [95% CI: 0.10; 0.21] in Model (1) and a non-significant increase of 4.52 percentage points [95% CI: -0.02; 0.11] in Model (4). Wald-tests for coefficient equality show that the estimates for SFL are significantly higher in Models (3) and (4), with $p < 0.001$ for both tests. Two-step

regression analyses show that Model (1) accounts for $R^2 = 0.018$ of total variance and Model (3) accounts for $R^2 = 0.059$, which is a significant increase in additional variance explained due to the inclusion of SFL (ΔR^2: $F(1507,1) = 8.767$, $p < 0.001$). The results thus show that SFL explains sustainable investment better than does advanced financial literacy. Investigating the potential mechanism, we find that a modest proportion of the relationship between SFL and sustainable investments is mediated by reduced perceptions of ESG investments as greenwashing (Appendix B.4).

Table 5. OLS-regression of sustainable investments on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		0.328***	0.309***	0.251***
		(0.034)	(0.038)	(0.039)
Advanced financial literacy	0.155***		0.034	0.045
	(0.029)		(0.032)	(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***	0.320***	0.307***	-0.067
	(0.021)	(0.019)	(0.023)	(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, successively adding control variables. Additional control variables in Model 4: Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. Standard errors are shown in parentheses. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

3.2.3. SFL is associated with lower potentially greenwashed investment

To test whether greater SFL predicts fewer potentially greenwashed investments (*H3*), we re-run the models from Table 5 but using potentially greenwashed investments as the outcome variable, and report the results in Table 6. By definition, only participants who have invested sustainably are included in these analyses (N = 1,081). The full stepwise models are shown in Table B.7 in the Appendix. We find that SFL relates to a reduction in potentially greenwashed investment by 17.70 percentage points [95% CI: -0.24; -0.11] in Model (2), and to one of 13.4 percentage points [95% CI: -0.21; -0.05] in Model (4). Advanced financial literacy relates to a reduction in potentially greenwashed investment by 10.70 percentage points [95% CI: -0.16; -0.05] in Model (1); however, the estimate becomes insignificant once SFL and other variables are controlled for. Wald-tests show that the coefficient estimates for SFL are marginally higher than those for advanced financial literacy in Model (4) ($F(1060, 1) = 3.69$, $p = 0.055$), while they are insignificant in Model (3) ($F(1078, 1) = 2.50$, $p = 0.114$). Furthermore, two-step regression analyses show that Model (1) accounts for $R^2 = 0.012$ of total variance and Model (3) for $R^2 = 0.025$, which is a significant increase in variance explained that is due to the inclusion of SFL (ΔR^2: $F(1078,1) = 14.808$, $p < 0.001$). 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).

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

	(1)	(2)	(3)	(4)
Sustainable finance literacy		-0.177***	-0.148***	-0.134**
		(0.034)	(0.038)	(0.041)
Advanced financial literacy	-0.107***		-0.054^{+}	-0.018
	(0.028)		(0.031)	(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***	0.529***	0.550***	0.698***
	(0.021)	(0.020)	(0.024)	(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 presents the results of the hierarchical models regressing potentially greenwashed investments on SFL, successively adding control variables. Additional control variables in Model 4: Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. Standard errors are shown in parentheses. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Logit regressions (Table 7) show that with higher SFL, the probability of correctly identifying the product that faced greenwashing allegations increases. When calculating the odds ratios, the results show that with perfect SFL, the odds for correctly identifying that fund are about four times higher 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, $p = 0.678$). Testing for coefficient equality, we find that the estimates for SFL are significantly higher in Models (3) and (4), with $p < 0.002$ in both

Wald-tests. These results support the previous result that high SFL is related to less potentially greenwashed investment, since participants with high SFL are substantially more likely to be able to correctly identify the fund that faced greenwashing allegations. Advanced financial literacy, by contrast, does not explain these results.

Table 7. Logistic regression of greenwashing identification on SFL.

	(1)	(2)	(3)	(4)
Sustainable finance literacy		1.512***	1.552***	1.456***
		(0.270)	(0.298)	(0.323)
Advanced financial literacy	0.468*		-0.075	-0.106
	(0.212)		(0.237)	(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***	-1.714***	-1.684***	-2.109**
	(0.163)	(0.169)	(0.193)	(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, successively adding control variables. Additional control variables in Model 4: Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. Standard errors are shown in parentheses. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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

Robustness checks in Appendix B.5 show that the 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, who

answered "*I don't know"* on all literacy questions, and who spent less than 30 seconds on the SFL questions or the investment decision. Applying these exclusion criteria as a robustness check aims show that the main results are robust even if excluding participants who potentially did not engage thoughtfully with the study materials, thereby also enhancing 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 then replicate the analyses we ran for our three outcome variables, and report the outcomes in more detail in Appendix B.5. This approach allows us to isolate the relationship between SFL and investment behavior in each subgroup separately.

The estimates for SFL are robust for stock market investments (Table B.12), sustainable investments (Table B.13) and for potentially greenwashed investments (Table. B.14), with the coefficients often being qualitatively larger among non-participants than among financial market participants. In summary, these findings alleviate investment experience as a main driver for the results, since non-financial market participants, by definition, lack investment experience that could have influenced their SFL, suggesting that the direction of the effect is most likely from SFL to behavior rather than the reverse.

To test the external validity of our results, we replicate the analyses regarding the relationship between SFL and, respectively, financial market investments, sustainable investments, as well as the potentially greenwashed investment, using similar self-reported behaviors as in Study 1 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 higher amounts in stock market products are about 4 times higher when SFL is high in Model (3). With the introduction of additional control variables in the subsequent Models, estimates of SFL turn insignificant and the odds ratio in Model (4) is 1.03. Our results on the relationship between the share of sustainable investments owned and SFL (Table B.15) are robust to these specifications: individuals with high SFL are on average

about 3.5 times as likely to hold more sustainable investments. Also, as SFL increases, so does the likelihood of seeking additional information in order to avoid greenwashing.

3.3. Discussion

3.3.1. Causality and correlates of SFL

Study 2 aimed to show how SFL is predictive of downstream investment behaviors and to determine its importance in investment decisions, on its own and relative to other concepts of financial literacy. Prior research considers the role of basic and advanced financial literacy (Filippini et al., 2024; Rossi et al., 2019) as well as environmental literacy (Anderson & 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 (*H1*), greater sustainable investments (*H2*), and fewer potentially greenwashed investments (*H3*). Comparing SFL with advanced financial literacy to gauge their relative levels of importance, our results show that SFL not only competes effectively with advanced financial literacy but often explains more variance and has larger effect sizes. Thus, SFL emerges as a key correlate of investment behavior, and should be considered 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 not do so because of high SFL but rather the reverse: their literacy could be a result of prior (sustainable) investment experience (Hastings et al., 2013; Lusardi & 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 and 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 driving investment behavior. We acknowledge that some participants who currently do not hold stock market products may have past investment experience. Nevertheless, we expect this subset to be relatively small and to not significantly affect the results.

We observe smaller effect sizes and lower differences of SFL compared to advanced financial literacy when looking at experienced investors or when using self-reported financial market investments as the outcome variable. These differences could be attributed to several factors. One possible explanation may be 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 where 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 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. Future research, however, would need to test these conjectures.

Why should SFL be predictive of investment behavior? Inadequate knowledge is a pertinent barrier to greater sustainable investments (Gutsche & Zwergel, 2020; Meunier & Ohadi, 2022; Wins & Zwergel, 2016). Financial literacy is related to the propensity for owning stocks (Lusardi & Mitchell, 2014), potentially due to its impact on the image individuals have of the stock market (Dobni & 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., to perceiving the stock market as less immoral) and of stockholders (i.e., to not seeing them as greedy, selfish, or gambler-like; Henkel and Zimpelmann, 2023). Although the mediation effects are modest, we find that these views in turn relate to greater stock market investments, both in the incentivized decisions and in the self-reported financial market investments. Thus, SFL may help overcome barriers such as stock market aversion, ambiguity, and financial disengagement (Anderson & Robinson, 2022; Antoniou et al., 2015; Kaustia & Torstila, 2011; Keller & 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 alleviates these issues, which also mediates the relationship with sustainable investments in both the incentivized and reported

sustainable investments. The hassle factor – the belief that sustainable investing is complicated and needs substantial time and effort – mediates the relationship only in reported investments, likely because the hassle factor is more relevant in real-world scenarios than in our stylized and simplified incentivized decision. SFL may thus, to some extent, promote sustainable investments. Another channel to be investigated in future research is risk return beliefs, as better knowledge of a specific investment product may reduce the perception of risk associated with it (Wang et al., 2011).

Regarding greenwashed investments, we conjectured that greater SFL would lead to lower potentially greenwashed investments by increasing individuals' ability to identify greenwashed products and by reducing greenwashing beliefs. Our results provide indications that the effect of SFL 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 in 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, a majority of the participants who invested in the sustainably marketed funds, including the fund that faced greenwashing allegations, did not revise their initial investment decision. The reasons for this might be varied. First, investors might be engaging in information avoidance, since reassessing their decision 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 (Heeb et al., 2023). Third, participants might either not believe the accusations presented or might not care about greenwashing. All of these reasons could result in a lower willingness to revise the decision. However, our results show that those participants who reported that they primarily invest sustainably in order to make an ESG impact are more inclined to change their decisions. Partially aligned with expectations that learning about greenwashing might lead to disengagement from the stock market due to disappointment, skepticism, frustration, or lowered trust, we observe that the participants who revised

their decision reduced the amount allocated to the greenwashed product by an average of about 70% 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.

3.3.2. Limitations

The following limitations should be considered when interpreting our results. First, in the incentivized investment decision in Study 2, we define potentially greenwashed investment as the proportion of total investments in the funds marketed as sustainable (Funds C and D) that is allocated to the fund that faced greenwashing allegations (Fund C). We infer that greater SFL predicts 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 these effects might be partially driven by a preference for investments in a fund that has a sustainability label (Fund D), rather than the explicit intent to avoid greenwashing. Nonetheless, 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 yet, leading to limited investor experience. We counter this argument by highlighting the recent surge of sustainable investments across the globe, for instance in the United States (Hartzmark & Sussman, 2019), which has indeed exposed investors to the practical aspects of sustainable finance and ESG investments. Furthermore, in large economic areas such as the European Union, financial advisors are now mandated to elicit clients' sustainability preferences in financial advisory, directly involving investors in sustainable finance considerations (Seifert et al., 2024). Additionally, the involvement of experts in developing our inventory of SFL also addresses this critique. Their input strengthens our belief that all statements in the measure are robust and will remain valid in the context of both current and forthcoming regulations in the near- to medium-term future, thereby reinforcing the relevance and applicability of the SFL concept despite the evolving nature of the field.

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 gains 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.

4. Conclusion

Is sustainable finance literacy essential to understanding investment behavior, or are basic and advanced financial literacy measures (Lusardi & Mitchell, 2008; Van Rooij et al., 2011) sufficient, even if they do not account for sustainable finance and ESG investments? To answer these questions, in Study 1 we developed a short, 7-question, and a long, 27-question inventory for sustainable finance literacy and find positive relationships with owning (sustainable) investments. In Study 2, we confirm these findings in an incentivized experiment and find that SFL is associated with more stock market investment, more sustainable investment, and fewer potentially greenwashed investments. Notably, SFL mostly outperforms other concepts, such as advanced financial literacy, in terms of variance explained in these three investment behaviors, often also demonstrating larger effect sizes. These findings are robust to splitting the sample into financial market participants and non-participants, thus partially addressing potential effects of previous investment experience, and to analyzing self-reported investment behavior, increasing the external validity of our findings. SFL therefore emerges as an important concept,

complementary to general financial literacy and other factors that help us understand investment decisions. Our results offer valuable insights to both researchers and practitioners on the pivotal role of SFL in investment behaviors that can, ultimately, contribute to a successful transition towards sustainable finance.

Participants correctly answer about half of the SFL questions, highlighting a significant potential for improvement. Enhancing SFL in the general population is important for several reasons. First, SFL may help direct financial flows towards genuinely sustainable investments that do not entail greenwashing. Second, it can increase stock market investments in general, aiding the sustainability transition by mobilizing the necessary private capital. 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 returns and ESG impact (Bekaert et al., 2023; Pástor et al., 2021; Von Wallis & 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 missing sustainability standards (Filippini et al., 2024), which is especially important for individuals with low literacy levels (Anderson & Robinson, 2022). Our results also show that greater SFL may be associated with less potentially greenwashed investment. Avoiding such investment is critical for avoiding potential negative impacts on resale values due to greenwashing accusations (Du, 2015; Gatti et al., 2021) and for fostering a genuine transition towards sustainable finance.

Policymakers should therefore prioritize enhancing SFL among the general population, as suggested for example by the OECD in a recent policy paper (OECD, 2023). In line with this recommendation, we propose that financial education should encompass SFL. A potential point of entry could be financial advisors. The majority of retail investors' investment decisions involve financial advisors (Paetzold et al., 2015), who play a pivotal role in the decision-making process and support particularly individuals with low SFL levels (Stolper & Walter, 2017). Advisors could also play a central role in elevating SFL, and ought to be incentivized to do so despite potential additional costs (e.g., additional training). SFL may positively influence (potential) investors' perceptions of and attitudes towards the stock market,

both of which are crucial for engaging in complex financial activities such as investing (Carpena & Zia, 2020). Advisors are uniquely positioned to attract individuals otherwise hesitant about the stock market, thereby expanding stock market investments and tapping into new customer segments. Importantly, firsthand experience in sustainable investing emerges as a key method for boosting literacy (Hilgert et al., 2003). Potentially, the effectiveness could be further enhanced by providing financial incentives to investors for completing a training, e.g., by offering a few large prizes among all participants (Bauer et al., 2022).

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 relative to advanced financial literacy. We suggest that future research on investment behavior should consider SFL as a control variable and as a determinant for 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 what the most effective methods for enhancing SFL are. 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) aimed at improving literacy and downstream financial behaviors that contribute to individual and societal welfare. This study lays the groundwork by elucidating the connection between SFL and investment behavior, offering valuable insights for further inquiry.

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Online Appendix

Appendix A. Study 1: Developing the SFL inventory

Appendix A.1. Sustainable finance literacy (SFL) questions (German and English)

Table A.1. Overview of expert feedback rounds for inventory development.

			Round		
Institution	Focus of Department/Expert	N experts	1	2	3
Austrian Financial Market Authority (FMA)	Conduct supervision of banks, investment strategies and sustainable finance	3	X		X
Environment Agency Austria (Umweltbundesamt)	Green finance	1	X		
Consumer Advocacy Austria (VKI)	Labels (UZ49), greenwashing	1		X	
Austrian National Bank (OeNB)	Green finance	1		X	
Austrian Bankers' Association (Bankenverband)	Banking law, sustainable finance	2		X	
Austrian Society for Environment and Technology (ÖGUT)	Green Investments	1		X	
Rating & consulting agency	Sustainable investment	1		X	
Consulting agency	Sustainable finance	1		X	
Financial advisor	Investment advice for retail investors	1		X	

Note. This table presents the experts involved in the feedback rounds for the inventory development. Experts within the same institution (displayed in table rows) provided joint feedback.

Table A.2. German original and English translation of all SFL questions of the inventory.

	German	English	true /false
Q1	Die Abkürzung ESG bedeutet Umwelt, Soziales und gute Unternehmensführung (Environmental, Social und Governance).	The abbreviation ESG stands for Environmental, Social and Governance.	true
Q2	Die Berücksichtigung von ESG-Faktoren beim Investieren hat das Ziel, mehr Profit zu erwirtschaften.	Considering ESG factors when investing aims to generate more profit.	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
Q6	Eine Geldanlage, die zu einem oder mehreren Umweltzielen der EU-Taxonomie beiträgt, ohne die jeweils anderen Umweltziele wesentlich zu beeinträchtigen, ist als ökologisch nachhaltig definiert.	An investment that contributes to one or several environmental objectives of the EU Taxonomy without significantly compromising other environmental goals is defined as ecologically sustainable.	true
Q7	Finanzinstitute müssen gemäß EU-Verordnung bei der Wertpapier-Anlageberatung die Kund:innen nach ihren ESG-Nachhaltigkeitspräferenzen befragen und diese berücksichtigen.	EU regulations require financial institutions to ask clients about their ESG sustainability preferences and take these into account when providing investment advice.	true
Q8	Nachhaltigkeitsratings von Finanzprodukten und Unternehmen, die durch private Ratingagenturen erstellt werden, haben untereinander vergleichbare Standards.	Sustainability ratings of financial products and companies issued by private rating agencies have comparable standards.	false
Q9	Die Begriffe „ESG“ und „grün“ in Bezug auf nachhaltige Anlageprodukte sind gesetzlich definiert. Wenn der Name eines Anlageprodukts diese Begriffe beinhaltet, weist dieses Produkt ein Qualitätssiegel (Label) auf.	The terms "ESG" and "green" are legally defined in the context of sustainable investment products. If the name of an investment product includes these terms, this product has an eco-label.	false
Q10	Die Berücksichtigung von Qualitätssiegeln, Nachhaltigkeitsratings und Nachhaltigkeitsberichten der Unternehmen reduziert die Gefahr, auf Greenwashing hereinzufallen.	The consideration of eco-labels, sustainability ratings, and sustainability reports from companies reduces the risk of falling for greenwashing.	true
Q11	Neben dem Factsheet, beinhalten auch das Basisinformationsblatt bzw. das KIID („Key Investor Information Document“) und der (Fonds-)Prospekt ausführliche Nachhaltigkeitsangaben zu einen Finanzprodukt.	In addition to the factsheet, the basic information sheet or the KIID ("Key Investor Information Document") and the (fund) prospectus also contain detailed sustainability information on a financial product.	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
Q13	Die Anlagestrategie "Best-in-class" bedeutet, dass von allen zur Auswahl stehenden Unternehmen einer Anlageklasse, diejenigen ausgewählt werden, die gewisse ESG-Kriterien am besten erfüllen.	The "best-in-class" investment strategy means that of all the companies available for selection in an asset class, those that best fulfill certain ESG criteria are selected.	true
Q14	Divestment bedeutet im Kontext von nachhaltigen Investments, dass Kapital aus Unternehmen, die auf Kosten von Umwelt und sozialen Aspekten wirtschaften, abgezogen wird.	In the context of sustainable investing, divestment means withdrawing capital from companies that operate at the expense of the environment and social aspects.	true

Q15	Die eigene Anlagestrategie sollte von jeder/jedem Anleger/in individuell gewählt werden, da sie von eigenen Nachhaltigkeitspräferenzen und insbesondere der Risikobereitschaft sowie dem Zeithorizont abhängig ist.	Each investor should individually choose their own investment strategy, as it depends on their own sustainability preferences and, in particular, their risk tolerance and time horizon.	true
Q16	Nachhaltige Anlageprodukte können neben Einzelaktien auch Anleihen, Investmentfonds oder Indexfonds bzw. ETFs (Exchange Traded Funds) sein.	Sustainable investment products can include individual stocks, bonds, investment funds, or index funds and ETFs (Exchange Traded Funds).	true
Q17	ESG-Anlageprodukte können nur bei spezifischen Händlern gekauft werden, die sich auf nachhaltige Produkte spezialisiert haben.	ESG investment products can only be purchased from specific retailers that specialize in sustainable products.	false
Q18	Die Anzahl und Vielfalt der verfügbaren nachhaltigen Anlageprodukte haben in den letzten Jahren deutlich zugenommen.	The number and variety of available sustainable investment products have increased significantly in recent years.	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
Q20	Der Finanzsektor hat große Wirkung auf die Realwirtschaft, weil er dazu beitragen kann, Kapitalflüsse stärker auf nachhaltige Investitionen auszurichten.	The financial sector has a significant impact on the real economy, as it can help to direct capital flows more towards sustainable investments.	true
Q21	Ein Investment in einen nachhaltigen Fonds, der Unternehmen mit einem niedrigen CO2e-Abdruck beinhaltet, reduziert direkt globale CO2e-Emissionen.	An investment in a sustainable fund that includes companies with a low CO2e footprint directly reduces global CO2e emissions.	false
Q22	Investor:innen und Fondsgesellschaften können Einfluss auf Unternehmen haben, indem sie vom Management Maßnahmen für eine nachhaltigere Geschäftstätigkeit fordern.	Investors and investment firms can influence companies by demanding for more sustainable business practices from management.	true
Q23	Impact-Investments haben insbesondere die Vermeidung schädlicher Geschäftsmodelle zum Ziel.	Impact investments specifically aim to avoid harmful business models.	false
Q24	Ein Nachhaltigkeitsrisiko ist ein Ereignis in den Bereichen Umwelt, Soziales oder Unternehmensführung, das sich negativ auf den Wert bzw. die Rendite einer Investition auswirken kann.	A sustainability risk is an event in the areas of environment, social, or governance that can negatively impact the value or return of an investment.	true
Q25	Nachhaltige ESG-Investments reduzieren das Risiko, dass das eigene Kapital in veraltete Technologien, Unternehmen oder Branchen investiert wird.	Sustainable ESG investments reduce the risk of investing one's capital in outdated technologies, companies, or industries.	true
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
Q27	Da nachhaltige Unternehmen die Kosten für die Überwachung und Berichterstattung von ESG-Daten tragen, schneiden sie an der Börse im Durchschnitt schlechter ab als	Since sustainable companies bear the costs of monitoring and reporting ESG data, they, on average, perform worse on the stock market than companies	false

	Unternehmen, die ESG-Richtlinien nicht einhalten.	that do not comply with ESG guidelines.	
Q28	Grüne Kredite („sustainablility linked loans“) können z.B. für energiesparende Projekte zu günstigeren Finanzierungskonditionen angeboten werden, wenn vorab festgelegte Nachhaltigkeitsziele erreicht werden.	Green loans ("sustainability-linked loans") can be offered at more favorable financing conditions, for example for energy-saving projects, if predefined sustainability objectives are achieved.	true
Q29	Bei einem nachhaltigen Girokonto oder Sparbuch, das mit dem Österreichischen Umweltzeichen (UZ49) versehen ist, werden Kundeneinlagen nachhaltig veranlagt oder für grüne Kredite weitervergeben.	For a sustainable checking account or passbook that is certified with the Austrian Eco-Label (UZ49), customer deposits are invested sustainably or re-lent for green loans.	true
Q30	Banken und Versicherungen veranlagen das Geld, das auf Sparkonten bzw. in Versicherungsprodukte einbezahlt wird, automatisch nachhaltig.	Banks and insurance companies automatically invest money paid into savings accounts or insurance products in a sustainable way.	false

Note. This table shows the original SFL questions and the English translations. The questions, initially formulated in German, were translated by three researchers and student assistants individually, then compared, and in case of disagreement a majority vote decided on the final translation.

Appendix A.2. Difficulty and discrimination index

The item difficulty index (also called item easiness) is a measure used to assess the difficulty level of a test item, focusing on how challenging the question is for participants (Ebel & Frisbie, 1972; Gronlund & Linn, 1990). Instead of merely calculating the overall percentage of correct responses, it employs the Truman Kelley method, which involves analyzing the share of correct responses among the top 27% and bottom 27% of overall performers in a sample. This approach provides a more nuanced understanding of item difficulty by comparing performance across different literacy levels within the sample. Items with a difficulty index below 0.2 are considered very difficult and may be candidates for removal from the test, as their inclusion could unfairly impact overall scores. Similarly, items with a difficulty index above 0.85 are considered too easy and might also be considered for deletion because they might not effectively differentiate between participants' literacy.

The item discrimination index is a crucial metric in test analysis, measuring an item's capacity to differentiate between high and low scorers. An item with high discrimination implies that participants with high overall scores on the SFL measure correctly answered the item, whereas those with low overall scores did not. This characteristic is essential for ensuring that test items are capable of

distinguishing between varying levels of participant knowledge or ability. An item with a discrimination index less than zero suggests the paradoxical situation where participants who otherwise performed poorly on the test tended to answer the item correctly more often than those who performed well. This could indicate that the item does not align with the test's intended literacy assessment. Items with a discrimination index ranging from 0 to 0.19 are considered to have poor discrimination and ought to be considered for deletion.

The results (Table A.3) show that Q9 and Q23 are below the recommended difficulty index threshold and the discrimination index threshold. Q21 also performs poorly in the discrimination index and lies close to the threshold for the difficulty index. Thus, we removed these questions from the measure to enhance the overall quality and reliability.

Table A.3. Difficulty and discrimination index.

Question	Lower group correct	Upper group correct	*N* correct	Difficulty index	Group difference	Discrimination index	Expert rating
Q1	81	252	333	0.588	171	0.604	1,29
Q2	34	149	183	0.323	115	0.406	2,86
Q3	102	265	367	0.648	163	0.576	1,43
Q4	79	261	340	0.601	182	0.643	1,14
Q5	30	234	264	0.466	204	0.721	1,42
Q6	39	224	263	0.465	185	0.654	2,29
Q7	47	210	257	0.454	163	0.576	2,43
Q8	30	96	126	0.223	66	0.233	2,57
Q9	32	73	105	0.186	41	0.145	2,00
Q10	60	234	294	0.519	174	0.615	2,00
Q11	20	211	231	0.408	191	0.675	2,86
Q12	37	232	269	0.475	195	0.689	1,14
Q13	45	215	260	0.459	170	0.601	1,43
Q14	20	171	191	0.337	151	0.534	3,00
Q15	129	268	397	0.701	139	0.491	2,14
Q16	68	266	334	0.590	198	0.700	2,00
Q17	30	158	188	0.332	128	0.452	3,57
Q18	141	280	421	0.744	139	0.491	2,43
Q19	35	154	189	0.334	119	0.420	2,29
Q20	103	268	371	0.655	165	0.583	1,86

Table A.3. Difficulty and discrimination index.

Question	Lower group correct	Upper group correct	*N* correct	Difficulty index	Group difference	Discrimination index	Expert rating
Q21	34	85	119	0.210	51	0.180	1,83
Q22	87	247	334	0.590	160	0.565	2,86
Q23	19	21	40	0.071	2	0.007	3,00
Q24	46	188	234	0.413	142	0.502	1,43
Q25	46	228	274	0.484	182	0.643	2,71
Q26	25	157	182	0.322	132	0.466	1,57
Q27	22	140	162	0.286	118	0.417	2,71
Q28	66	238	304	0.537	172	0.608	2,00
Q29	44	217	261	0.461	173	0.611	1,14
Q30	125	226	351	0.620	101	0.357	2,71

Note. This table presents the difficulty and discrimination indices of the 30 SFL questions as well as the questions' expert ratings. Expert rating were based on school notes: 1 = good and important, 5 = not good, important. Note that we used the number of correctly answered questions relative to the overall sample rather than only those who tried to answer the question.

Appendix A.3. Exploratory factor analysis (Study 1)

As preregistered, we used an exploratory factor analysis (principal component analysis; PCA) with Promax rotation, an oblique rotation method that allows for correlation among factors, to examine whether SFL is composed of different categories of knowledge (Table A.4). In our first analysis, PCA1, we study all questions simultaneously. PCA1's structure matrix suggests a four-factor solution in which Factor 1 represents questions on which the correct answer is "true", and Factors 2 through 4 represent "false" questions, with Factors 1 and 2 sharing many questions that load above 0.50 on both factors. Thus, the results indicate that the PCA is sensitive to the "true" and "false" statements (i.e., the answer format), despite the latter questions having been recoded for the analysis and regardless of the content. Therefore, in PCA2, we retained only the "true" questions. Its structure matrix yields a two-factor solution in which all questions load with at least 0.39 on both factors. In PCA3, we also retain only "true" questions and force the analysis to generate only one factor. We obtain loadings of at least 0.46 and an explained variance of 39.90%, indicating that sustainable finance knowledge is likely not composed of different knowledge categories but is instead a homogeneous construct.

Table A.4. Principal component analyses.

	PCA1				PCA2		PCA3
	Factors 1 to 4				Factors 1 to 2		Factor 1
	1	2	3	4	1	2	1
Q1_ESG meaning	**0,696**	0,372	-0,086	0,06	**0,563**	**0,69**	**0,662**
Q2_ESG strategy *(R)*	-0,108	-0,322	**0,59**	-0,09			
Q3_greenwashing meaning	**0,684**	0,268	-0,014	0,004	**0,501**	**0,657**	**0,61**
Q4_labels	**0,71**	**0,527**	-0,122	0,266	**0,675**	**0,68**	**0,719**
Q5_taxonomy meaning	**0,64**	**0,538**	-0,082	0,048	**0,679**	**0,562**	**0,656**
Q6_criteria sustainable	**0,635**	**0,522**	-0,155	-0,036	**0,631**	**0,569**	**0,636**
Q7_preference elicitation	**0,559**	**0,573**	-0,129	0,181	**0,635**	0,471	**0,582**
Q8_ratings *(R)*	-0,346	-0,652	0,376	-0,201			
Q10_greenwashing	**0,53**	**0,523**	-0,184	**0,51**	**0,576**	**0,527**	**0,585**
Q11_documents	**0,587**	0,463	-0,123	0,062	**0,566**	**0,566**	**0,6**
Q12_exclusion criteria	**0,54**	**0,564**	-0,179	-0,017	**0,64**	0,457	**0,576**
Q13_best in class	**0,564**	0,442	-0,252	0,352	**0,589**	**0,549**	**0,603**
Q14_divestment	**0,557**	**0,589**	-0,174	-0,145	**0,615**	0,49	**0,583**
Q15_individual strategy	**0,668**	0,313	-0,065	0,177	**0,526**	**0,708**	**0,648**
Q16_products	**0,734**	0,384	-0,07	0,108	**0,58**	**0,751**	**0,699**
Q17_product purchase *(R)*	-0,061	-0,278	**0,581**	-0,359			
Q18_product increase	**0,803**	0,38	-0,035	0,16	**0,617**	**0,798**	**0,743**
Q19_fees *(R)*	-0,087	-0,189	**0,655**	-0,148			
Q20_impact economy	**0,695**	0,437	-0,076	0,295	**0,628**	**0,686**	**0,696**
Q22_engagement	**0,598**	0,463	-0,102	0,163	**0,598**	**0,597**	**0,634**
Q24_sustainability risk	0,434	0,412	-0,412	0,18	0,477	0,392	0,46
Q25_stranded assets	**0,529**	**0,575**	-0,142	0,323	**0,624**	0,495	**0,591**
Q26_performance *(R)*	-0,088	-0,24	**0,682**	-0,09			
Q27_costs & performance *(R)*	-0,107	-0,285	**0,611**	-0,041			
Q28_green loans	**0,658**	**0,568**	-0,183	0,175	**0,661**	**0,632**	**0,686**
Q29_saving sustainable	**0,576**	**0,509**	-0,009	0,142	**0,585**	**0,559**	**0,607**
Q30_banks *(R)*	0,001	-0,479	**0,578**	-0,209			
Q9_name *(R)*	-0,403	-0,56	0,373	-0,238			
Q21_impact_environ. *(R)*	-0,363	-0,662	0,257	-0,167			
Q23_impact_investments *(R)*	-0,565	-0,518	0,289	-0,141			

Note. This table presents the principal component analyses of the 27 SFL questions. *(R)* indicates that the question is reverse-coded, i.e., "false", and recoded for data analysis.

Appendix A.4. Descriptive statistics and additional results (Study 1)

The average correctness rate across the 30 questions was 46.9% (*SD* = 20.41%). The most frequently correctly answered question was Q18 – whether the number of available sustainable investment products increased in recent years, with more than 80% of participants answering correctly. The least correctly answered question was Q23 – only 6.8% of respondents answered this correctly.

Table A.5. Overview on correct responses to 30 SFL questions.

Question	*N*	*M*	*SD*	*N* correct	% correct	Don't know	% Don't know
Q18 product increase	1,047	4.288	0.821	840	80.23	72	6.88
Q15 individual strategy	1,047	4.249	0.892	792	75.64	89	8.50
Q1 ESG meaning	1,047	4.184	0.965	666	63.61	208	19.87
Q3 greenwashing meaning	1,047	4.176	1.024	722	68.96	131	12.51
Q16 products	1,047	4.087	0.840	686	65.52	193	18.43
Q20 impact economy	1,047	4.067	0.899	736	70.30	115	10.98
Q4 labels	1,047	3.999	0.917	680	64.95	172	16.43
Q22 engagement	1,047	3.862	0.960	664	63.42	136	12.99
Q28 green loans	1,047	3.853	0.906	622	59.41	192	18.34
Q5 taxonomy meaning	1,047	3.840	0.972	524	50.05	291	27.79
Q30 banks (R)	1,047	3.791	1.151	643	61.41	78	7.45
Q13 best in class	1,047	3.756	0.972	518	49.47	281	26.84
Q11 documents	1,047	3.718	0.938	445	42.50	346	33.05
Q12 exclusion criteria	1,047	3.710	1.020	530	50.62	255	24.36
Q6 criteria sustainable	1,047	3.702	0.947	502	47.95	284	27.13
Q7 preference elicitation	1,047	3.670	1.102	505	48.23	241	23.02
Q10 greenwashing	1,047	3.663	1.027	588	56.16	139	13.28
Q25 stranded assets	1,047	3.643	1.030	557	53.20	190	18.15
Q29 saving sustainable	1,047	3.633	1.027	496	47.37	263	25.12
Q24 sustainability risk	1,047	3.517	1.025	476	45.46	230	21.97
Q14 divestment	1,047	3.513	1.022	341	32.57	402	38.40
Q17 product purchase (R)	1,047	3.094	1.184	319	30.47	270	25.79
Q2 ESG strategy (R)	1,047	3.067	1.150	318	30.37	226	21.59
Q27 costs & performance (R)	1,047	3.006	1.006	250	23.88	277	26.46
Q19 fees (R)	1,047	2.980	1.174	302	28.84	183	17.48
Q26 performance (R)	1,047	2.962	1.043	270	25.79	197	18.82
Q8 ratings (R)	1,047	2.855	1.062	241	23.02	221	21.11
Q21 impact environment (R)	1,047	2.730	1.204	247	23.59	164	15.66

Table A.5. Overview on correct responses to 30 SFL questions.

Question	*N*	*M*	*SD*	*N* correct	% correct	Don't know	% Don't know
Q9 name (R)	1,047	2.524	1.145	170	16.24	227	21.68
Q23 impact investments (R)	1,047	2.442	0.959	71	6.78	404	38.59

Note. This table presents the mean values and frequency of correct answers to the 30 SFL questions in Study 1 (N = 1,047). M = Mean, *SD* = Standard deviation.

Appendix A.5. SFL and self-reported (sustainable) stock market investments (Study 1)

Table A.6. Logistic regression of self-reported investments on literacy measures.

	Financial market investments		Sustainable financial market investments	
	(1)	(2)	(3)	(4)
SFL	1.349***	0.911**	1.455***	0.823*
	(0.281)	(0.303)	(0.315)	(0.335)
Basic financial literacy objective	1.305***	1.036***	0.577^{+}	0.359
	(0.277)	(0.292)	(0.311)	(0.324)
Advanced financial literacy objective	1.389***	1.280***	0.746*	0.653*
	(0.272)	(0.280)	(0.310)	(0.320)
Sustainability literacy objective	0.145	-0.061	0.475	0.186
	(0.284)	(0.323)	(0.305)	(0.343)
Gender: female		-0.632***		-0.498**
		(0.149)		(0.164)
Age		-0.0004		-0.006
		(0.004)		(0.005)
University degree (Ref.: no)		0.437**		0.134
		(0.159)		(0.169)
Household income above median		0.555***		0.413*
		(0.167)		(0.175)
Household income not reported		0.225		-0.157
		(0.195)		(0.227)
Education in economics		0.147*		0.097
		(0.073)		(0.077)
Professional experience		-0.163		-0.083
		(0.208)		(0.218)
Hassle factor investments		-0.256***		-0.034
		(0.069)		(0.071)
Hassle factor sustainable investments		-0.063		-0.303***
		(0.073)		(0.076)

Table A.6. Logistic regression of self-reported investments on literacy measures.

	Financial market investments		Sustainable financial market investments	
	(1)	(2)	(3)	(4)
Sustainable lifestyle		0.021		0.109
		(0.065)		(0.071)
Climate change awareness		0.025		0.060
		(0.056)		(0.062)
Constant	-2.994***	-1.574*	-3.086***	-1.689**
	(0.255)	(0.486)	(0.283)	(0.538)
N	1047	1047	1047	1047
Nagelkerke pseudo R2	0.208	0.196	0.104	0.311

Note. This table presents the results of the hierarchical models regressing reported (sustainable) financial market on SFL, successively adding control variables, based on the sample of Study 1. Standard errors are shown in parentheses. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Appendix B. Study 2: SFL and investment decisions

Appendix B.1. Fund screening and selection for the incentivized investment decision.

In 2022, the Baden-Württemberg consumer center raised greenwashing allegations against Fund C. Using this historical example, we included the DWS Invest ESG Climate Tech LC fund as potentially greenwashed fund (Fund C), using parts of the fund description that were subject to the allegations. To find the alternative funds for the investment decision, we used Refinitiv's EIKON's funds screener and restricted our search to all equity mutual funds notified for trade in Austria (date of retrieval: 04.09.2023). We specifically searched for funds with a theme of (alternative) energy. We aimed for four funds in total, one fund labeled as Article 9 (according to the EU Disclosure regulation; "dark green"), one fund labeled Article 8 (but with the abovementioned formulations for which the fund faced greenwashing allegations; "light green"), and two Article 6 according to the EU's Sustainable Finance Disclosure Regulation (SFDR). Table B.1 gives an overview on the four funds. The sustainable fund is moreover the second most sustainable equity mutual fund aligned with Article 9 according to a test of

sustainable funds in Austria, conducted by Cleanvest and the Austrian Chamber of Labor (Fund C was not rated).[10]

Table B.1. Overview on the equity mutual funds used in the investment decision.

Fund	A (conventional)	B (conventional)	C (greenwashing allegations)	D (sustainable)
Name	Schroder ISF Global Energy A Acc USD	Raiffeisen-Energie-Aktien R T	DWS Invest ESG Climate Tech LC	Raiffeisen-SmartEnergy-ESG-Aktien (R) T
ISIN	LU0256331488	AT0000688676	LU1863264153	AT0000A2DFF8
SFDR	Art. 6	Art. 6	Art. 8	Art. 9
Refinitiv ESG score	58.3	61.6	66.2	67.5
MSCI carbon intensity[11]	327.3	199.9	241.1	163.3
Cleanvest rating[12]	5.6	5.2	7.0	8.2
Label	none	none	none	UZ49, FNG-label
Risk	6	5	4	5
Performance 3y	175.6	54.2	15.7	12.7
TER	1.9	2.2	1.6	1.6
Volume	454	136	904	326

Note. This table presents further information on the funds used in the incentivized investment experiment. SFDR shows sustainability classification after the EU's SFDR regulation; Refinitiv ESG score shows Refinitiv's combined ESG score; MSCI carbon intensity shows the MSCI carbon intensity (CO2e per m$ sales); Cleanvest rating shows the Cleanvest rating (out of 10 points maximum); Risk shows the risk classification (max. 7, high risk); Performance 3y. shows the 3-year performance up to 03.09.2023; TER is the total expense ratio; Volume shows the fund volume in million US-dollars.

Appendix B.2. Additional descriptive statistics and results (Study 2)

In Study 1 the response options were on a five-point Likert-scale (anchored at 1 = *definitely false* and 5 = *definitely true*) while in Study 2 the answer options were *true* and *false*. The average of correct answers per question is comparable among Studies 1 and 2 (Table 2). The different answering formats in the two studies thus did not lead to any marked differences in the share of correct answers. That said, the shares of *I don't know* answers is higher in Study 2, which might to some degree be rooted in the different answer options. In Study 1, the answer option 3 = *undecided* comes close to an *I don't know* indication, and when considering the actual *I don't know* responses and the *undecided* responses in

[10] https://ooe.arbeiterkammer.at/beratung/konsumentenschutz/geld/geldanlage/KS_2023_Studie_Wie_gruen_sind_Oesterreichs_nachhaltige_Fonds.pdf
[11] https://www.msci.com/our-solutions/esg-investing/esg-fund-ratings-climate-search-tool
[12] https://www.cleanvest.org/de/

Study 1 (Q3: 11.08% , Q4: 13.09% , Q5: 16.43% , Q12: 14.52%, Q16: 12.61%, Q19: 22.54%, Q26: 28.18%), the overall share becomes more similar between Study 1 and Study 2. We consider learning effects unlikely, since only four participants participated in both Study 1 and in Study 2 (identified via comparison of the personalized IDs supplied by the market research agency).

Table B.2. Descriptive statistics on SFL.

Question	Study 1 (N = 1,047)		Study 2 (N = 1,510)	
	Correct (f, %)	Don't know (f, %)	Correct (f, %)	Don't know (f, %)
Question 3. Greenwashing means that a financial product is, for example, advertised as environmentally friendly even though environmental aspects are hardly or not considered in the investment strategy. *(true)*	722 (68.96%)	131 (12.51%)	1020 (67.55%)	390 (25.82%)
Question 4. Quality labels such as the Austrian Eco-Label (UZ49) aim to ensure that an investment product meets defined sustainability criteria. *(true)* [Austria specific question]	680 (64.95%)	172 (16.43%)	975 (64.57%)	472 (31.26%)
Question 5. The EU Taxonomy is a classification system that defines which economic activities are considered environmentally sustainable (= green). *(true)* [EU specific questions]	524 (50.05%)	291 (27.79%)	678 (44.90%)	744 (49.27%)
Question 12. Exclusion criteria can be used to exclude countries, sectors or companies that do not meet certain ESG criteria from personal investments. *(true)*	530 (50.62%)	255 (24.36%)	594 (39.34%)	766 (50.72%)
Question 16. Sustainable investment products can include individual stocks, bonds, investment funds, or index funds and ETFs (Exchange Traded Funds). *(true)*	686 (65.52%)	193 (18.43%)	882 (58.41%)	541 (35.83%)
Question 19. The fees for sustainable investment products are always significantly higher than those for conventional investment products. *(false)*	302 (28.84%)	183 (17.48%)	594 (39.34%)	558 (36.95%)
Question 26. Returns are significantly lower for sustainable ESG financial products than for conventional financial products. *(false)*	270 (25.79%)	197 (18.82%)	446 (29.54%)	689 (45.63%)

Note. This table presents the share of correct answers and *I don't know* answers to our seven SFL questions. f = frequency, % = percentage of sample. Questions in Study 1 were answered on a 5-point Likert-scale with labels (1 = definitely false, 2 = likely false, 3 = undecided, 4 = likely true, 5= definitely true) with the option to answer, "I do not know". Answers are rated as correct, if the response to the (recoded) question is either "likely true" or "definitely true". Questions in Study 2 were answered with "true", "false" or "I don't know".

Table B.3. Correlation table of SFL items with investment behavior.

	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. SFL (7 questions)	0.49 (0.28)															
2. Q3 correct	0.68 (0.47)	0.53														
3. Q4 correct	0.65 (0.48)	0.57	0.21													
4. Q5 correct	0.45 (0.50)	0.60	0.27	0.28												
5. Q12 correct	0.39 (0.49)	0.54	0.15	0.23	0.26											
6. Q16 correct	0.58 (0.49)	0.63	0.25	0.27	0.26	0.22										
7. Q19 correct	0.39 (0.49)	0.59	0.22	0.18	0.16	0.15	0.31									
8. Q26 correct	0.30 (0.46)	0.56	0.14	0.21	0.18	0.17	0.24	0.36								
9. Stock market investments	0.71 (0.35)	0.26	0.16	0.16	0.13	0.08	0.22	0.19	0.13							
10. ESG investments	0.48 (0.38)	0.24	0.13	0.19	0.09	0.08	0.14	0.16	0.21	0.31						
11. Greenwashed investments	0.44 (0.30)	-0.16	-0.11	-0.14	-0.11	-0.03	-0.06	-0.10	-0.08	-0.09	-0.15					
12. Greenwashing correctly identified	0.28 (0.45)	0.19	0.17	0.13	0.09	0.06	0.07	0.11	0.13	0.09	0.10	-0.10				
13.No greenwashing in follow up	0.25 (0.43)	-0.30	-0.27	-0.21	-0.20	-0.15	-0.17	-0.14	-0.10	-0.22	-0.15	0.04	-0.35			
14. Self-reported financial market assets	0.84 (1.21)	0.27	0.14	0.08	0.17	0.12	0.25	0.24	0.11	0.25	0.09	-0.03	0.07	-0.16		
15. Self-reported sustainable assets	0.52 (0.97)	0.25	0.10	0.11	0.14	0.12	0.20	0.22	0.15	0.17	0.17	-0.03	0.09	-0.18	0.75	

Note. This table presents the correlations between SFL, answering each SFL item correctly, and investment behaviors. M = mean, SD = standard deviation. All correlations computed using Spearman's Rho. Correlations with $r_s > 0.10$ are significant at $p < 0.001$, and correlations below $r_s = 0.05$ are not significant ($p > 0.05$) while correlations in between these thresholds are significant at least at $p < 0.05$.

Table B.4. Descriptive statistics of explanatory variables

Explanatory variable	*N*	*M*	*SD*	*Min*	*Max*
SFL	1,510	0.49	0.28	0	1
Advanced financial literacy	1,510	0.66	0.33	0	1
Female	1,510	51.2%	50.0%	-	-
Age in years	1,510	49.03	16.92	18	85
University degree	1,510	15.3%	36.0%	-	-
High household income	1,510	24.7%	43.1%	-	-
Household income not reported	1,510	16.5%	37.1%	-	-
Investment experience in years	1,510	2.17	2.67	0	7
Stockholder image (Cronbach's α = 0.78)	1,510	3.94	1.28	1	7
Stock market image: Immorality	1,510	3.61	1.51	1	7
Stock market image: Wealth creating	1,510	3.93	1.36	1	7
Stock market image: ESG	1,510	4.62	1.44	1	7
Hassle factor	1,510	4.18	1.52	1	7
Greenwashing beliefs	1,510	4.43	1.24	1	7
Biospheric Values (Cronbach's α = 0.84)	1,510	5.46	1.24	1	7
Altruistic Values (Cronbach's α = 0.84)	1,510	5.52	1.26	1	7
Risk taking	1,510	3.17	1.52	1	7
Patience	1,510	4.54	1.31	1	7
General trust	1,510	2.88	1.46	1	7
Left wing views	1,510	3.95	1.25	1	7

Note. This table reports the descriptive statistics of the explanatory variables included in the econometric analyses. *N* = number of observations, *M* = mean, *SD* = standard deviation.

Appendix B.3. Full regression tables (Study 2)

Table B.5. OLS-regression of stock market investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SFL		0.366***	0.294***	0.263***	0.238***	0.234***	0.187***
		(0.031)	(0.035)	(0.035)	(0.035)	(0.036)	(0.035)
Advanced financial literacy	0.243***		0.128***	0.121***	0.111***	0.108***	0.084**
	(0.026)		(0.029)	(0.030)	(0.030)	(0.030)	(0.030)
Female (Ref.: male)				-0.064***	-0.070***	-0.067***	-0.037*
				(0.018)	(0.018)	(0.018)	(0.018)
Age in years				-0.002***	-0.002***	-0.002***	0.000
				(0.001)	(0.001)	(0.001)	(0.001)
University degree (Ref.: no)				0.014	0.009	0.008	-0.013
				(0.024)	(0.024)	(0.024)	(0.024)
High household income				0.007	0.004	0.005	0.006
				(0.021)	(0.021)	(0.021)	(0.020)
Household income not reported				-0.012	-0.017	-0.017	-0.016
				(0.024)	(0.024)	(0.024)	(0.023)
Investment experience in years				0.007*	0.003	0.003	-0.006
				(0.004)	(0.004)	(0.004)	(0.004)
Stockholder image					-0.018*	-0.018*	-0.014+
					(0.008)	(0.008)	(0.008)
Stock market image: Immorality					-0.019**	-0.019**	-0.014*
					(0.007)	(0.007)	(0.007)
Stock market image: Wealth creating					-0.016*	-0.016*	-0.007
					(0.006)	(0.006)	(0.006)
Stock market image: ESG					-0.002	-0.003	0.000
					(0.006)	(0.007)	(0.007)
Hassle factor						-0.008	-0.006
						(0.006)	(0.006)

Table B.5. OLS-regression of stock market investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Greenwashing beliefs						0.008	0.007
						(0.008)	(0.008)
Biospheric Values							0.010
							(0.009)
Altruistic Values							-0.020*
							(0.009)
Risk taking							0.052***
							(0.007)
Patience							0.020**
							(0.007)
General trust							-0.001
							(0.006)
Left wing views							0.018**
							(0.007)
Constant	0.548***	0.530***	0.480***	0.616***	0.855***	0.856***	0.462***
	(0.019)	(0.017)	(0.021)	(0.034)	(0.055)	(0.060)	(0.081)
N	1510	1510	1510	1510	1510	1510	1510
R2	0.054	0.085	0.097	0.118	0.138	0.139	0.186
R2 Adj.	0.053	0.085	0.096	0.113	0.131	0.131	0.175

Note. This table presents the results of the hierarchical models regressing stock market investments on SFL, successively adding control variables. Note that Model (7) in this table corresponds to Model (4) in the main paper. We use a Wald-test to test for coefficient equality and find that the coefficient estimates for SFL are significantly higher in Model (3) ($F(1507, 1) = 9.27$, $p = 0.002$), Model (4) ($F(1507, 1) = 6.74$, $p = 0.01$), Model (5) ($F(1507, 1) = 5.52$, $p = 0.019$) and Model (6) ($F(1507, 1) = 5.32$, $p = 0.021$), while in Model (7) the ($F(1507, 1) = 3.70$, $p = 0.054$), the difference is only weakly significant. Standard errors are shown in parentheses. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B.6. OLS-regression of sustainable investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SFL		0.328***	0.309***	0.323***	0.322***	0.318***	0.251***
		(0.034)	(0.038)	(0.039)	(0.039)	(0.039)	(0.039)
Advanced financial literacy	0.155***		0.034	0.058+	0.053	0.062+	0.045
	(0.029)		(0.032)	(0.033)	(0.033)	(0.033)	(0.032)
Female (Ref.: male)				0.053**	0.041*	0.042*	0.021
				(0.020)	(0.020)	(0.020)	(0.020)
Age in years				-0.002**	-0.002**	-0.002**	-0.001*
				(0.001)	(0.001)	(0.001)	(0.001)
University degree (Ref.: no)				0.011	0.016	0.014	-0.021
				(0.027)	(0.027)	(0.027)	(0.026)
High household income				-0.007	-0.010	-0.010	-0.007
				(0.023)	(0.023)	(0.023)	(0.022)
Household income not reported				0.043	0.041	0.040	0.033
				(0.026)	(0.026)	(0.026)	(0.025)
Investment experience in years				-0.001	-0.002	-0.003	-0.004
				(0.004)	(0.004)	(0.004)	(0.004)
Stockholder image					-0.030***	-0.024**	-0.016*
					(0.008)	(0.009)	(0.008)
Stock market image: Immorality					0.006	0.011	0.011
					(0.007)	(0.007)	(0.007)
Stock market image: Wealth creating					0.018**	0.017*	0.015*
					(0.007)	(0.007)	(0.007)
Stock market image: ESG					0.000	0.006	0.001
					(0.007)	(0.007)	(0.007)
Hassle factor						-0.004	-0.007
						(0.007)	(0.007)

Table B.6. OLS-regression of sustainable investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Greenwashing beliefs						-0.031***	-0.022**
						(0.009)	(0.008)
Biospheric Values							0.044***
							(0.010)
Altruistic Values							-0.018+
							(0.010)
Risk taking							-0.004
							(0.007)
Patience							0.031***
							(0.008)
General trust							0.027***
							(0.007)
Left wing views							0.049***
							(0.008)
Constant	0.378***	0.320***	0.307***	0.330***	0.364***	0.450***	-0.067
	(0.021)	(0.019)	(0.023)	(0.037)	(0.061)	(0.066)	(0.088)
N	1510	1510	1510	1510	1510	1510	1510
R2	0.019	0.059	0.060	0.073	0.085	0.094	0.162
R2 Adj.	0.018	0.058	0.059	0.068	0.078	0.085	0.150

Note. This table presents the results of the hierarchical models regressing sustainable investments on SFL, successively adding control variables. Note that Model (7) in this table corresponds to Model (4) in the main paper. We use a Wald-test to test for coefficient equality and find that the coefficient estimates for SFL are significantly higher in Models (3) to (7) with $p < 0.001$ for all tests. Standard errors are shown in parentheses. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B.7. OLS-regression of potentially greenwashed investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SFL		-0.177***	-0.148***	-0.128**	-0.135***	-0.135***	-0.134**
		(0.034)	(0.038)	(0.039)	(0.040)	(0.040)	(0.041)
Advanced financial literacy	-0.107***		-0.054^{+}	-0.028	-0.020	-0.019	-0.018
	(0.028)		(0.031)	(0.032)	(0.033)	(0.033)	(0.033)
Female (Ref.: male)				-0.008	-0.009	-0.009	0.002
				(0.019)	(0.019)	(0.019)	(0.020)
Age in years				-0.001*	-0.001+	-0.001+	-0.001
				(0.001)	(0.001)	(0.001)	(0.001)
University degree (Ref.: no)				-0.024	-0.026	-0.026	-0.025
				(0.026)	(0.026)	(0.026)	(0.026)
High household income				-0.025	-0.022	-0.022	-0.023
				(0.023)	(0.023)	(0.023)	(0.023)
Household income not reported				-0.004	-0.003	-0.002	0.000
				(0.026)	(0.026)	(0.026)	(0.026)
Investment experience in years				-0.006	-0.006	-0.006	-0.008+
				(0.004)	(0.004)	(0.004)	(0.004)
Stockholder image					0.012	0.013	0.014
					(0.008)	(0.009)	(0.009)
Stock market image: Immorality					-0.002	-0.001	-0.001
					(0.007)	(0.008)	(0.008)
Stock market image: Wealth creating					-0.008	-0.008	-0.006
					(0.007)	(0.007)	(0.008)
Stock market image: ESG					-0.017*	-0.017*	-0.015*
					(0.007)	(0.007)	(0.007)
Hassle factor						0.000	0.000
						(0.007)	(0.007)

Table B.7. OLS-regression of potentially greenwashed investments on SFL.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Greenwashing beliefs						-0.003	-0.004
						(0.009)	(0.009)
Biospheric Values							-0.008
							(0.011)
Altruistic Values							-0.009
							(0.011)
Risk taking							0.009
							(0.008)
Patience							0.008
							(0.009)
General trust							-0.008
							(0.007)
Left wing views							-0.002
							(0.008)
Constant	0.508***	0.529***	0.550***	0.604***	0.667***	0.674***	0.698***
	(0.021)	(0.020)	(0.024)	(0.035)	(0.062)	(0.067)	(0.091)
N	1081	1081	1081	1081	1081	1081	1081
R2	0.013	0.024	0.027	0.036	0.043	0.043	0.050
R2 Adj.	0.012	0.023	0.025	0.029	0.032	0.031	0.032

Note. This table presents the results of the hierarchical models regressing potentially greenwashed investments on SFL, successively adding control variables. Note that Model (7) in this table corresponds to Model (4) in the main paper. We use a Wald-test to test for coefficient equality and find that the coefficient estimates for SFL marginally higher in Model (5) ($F(1) = 3.72$, $p = 0.054$), Model (6) ($F(1) = 3.74$, $p = 0.054$) and Model (7) ($F(1) = 3.69$, $p = 0.055$), while being close to $p = 0.10$ in Model (3) ($F(1) = 2.50$, $p = 0.114$) and Model (4)) ($F(1) = 2.84$, $p = 0.092$). Standard errors are shown in parentheses. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Appendix B.4. Exploring the mechanisms linking SFL and investment behavior (Study 2)

We use mediation analyses to study whether SFL also has an indirect effect on our outcome variables, i.e., whether part of the main effect is mediated by other underlying variables (as in Cronqvist et al., 2015). This method yields a comprehensive overview of the pathways along which SFL relates to the outcome variables. Table B.8. presents the results of the simultaneous examination of the direct and indirect effects of SFL on stock market investments (Table B.8., Panel A), on sustainable investments (Table B.8., Panel B), and on potentially greenwashed investments (Table B.8., Panel C), both in the incentivized decision and using self-reported investments. We first report the coefficient estimates and second the effect size relative to the total effect (direct and indirect). For easier interpretation, we also report the overall combined indirect effect.

First, we propose a mediation model where the relationship between SFL and stock market investments (incentivized and self-reported) is mediated by participants holding an immoral image of the stock market and of stockholders. The mechanisms behind the increase in stock market investments could be that SFL relates to the individual's perception of the stock market and of stockholders. The existing literature already links basic financial literacy to a more positive view of the stock market (Dobni & Racine, 2015, 2016), while a negative image of stockholders (greedy, selfish, gambler-like) is associated with reduced stock market investments (Henkel & Zimpelmann, 2023). Knowledge regarding ESG investments could counteract stock market aversion and help to overcome negative attitudes towards the stock market (Briere & Ramelli, 2021). These considerations align with other findings, showing that personal values significantly influence investment decisions. For example, left-wing voters and those viewing the stock market as unethical display greater stock market aversion and are less inclined to invest (Kaustia & Torstila, 2011; Keller & Siegrist, 2006). Also, strong pro-environmental attitudes are associated with financial disengagement, e.g., being less likely to own stocks (Anderson & Robinson, 2022) and the financial nature of the stock market leads to low interest in stock market investments (Kaur & Vohra, 2012). SFL – particularly knowledge about the non-financial dimension of ESG investments – could counteract the negative image of the stock market and stockholders, thus encouraging broader participation.

The results of the mediation analysis show that SFL has a positive effect on stock market investments. We find significant indirect positive effects of stock market image (both in terms of its wealth creating capacity and its morality) and the image of stockholders. The direct effects dominate the indirect effects both in the incentivized decision and in the self-reported stock market investments (Table B.8., Panel A). This implies that the direct effect of SFL is stronger. The combined indirect effect of both mediators is about 13 percent in incentivized decisions, and about 25 percent in reported stock market investments.

Second, we propose a mediation model where the relationship between SFL and sustainable investments (incentivized and self-reported) is mediated by greenwashing beliefs, i.e., that "green" assets are usually greenwashed, and by the hassle factor, i.e., the belief that sustainable investing is too complex. The potential mechanisms behind this increase in sustainable investments could be that SFL relates to an enhanced understanding of ESG impact and more accurate risk-return related beliefs, as well as to a reduction in subjective uncertainty and perceived information costs. In the broader context of stock market investments in general, information costs reduce the propensity to own stocks, whereas greater stock market literacy reduces these costs and consequently increases expected returns (Balloch et al., 2015; Campbell, 2006). Additionally, survey studies provide causal evidence that ignorance of one's own stock market-related knowledge is a key determinant of low participation in the stock market (Yoong, 2011). Applying these findings to the field of sustainable investments, we argue that greater SFL might bridge information gaps and reduce information costs, thereby facilitating more informed and easier sustainable investment decisions. This could lead to changes in sustainable investment behavior such as in the amount invested in funds marketed as sustainable.

We find a positive direct effect of SFL on ESG investments in the incentivized decision as well as on self-reported holdings of sustainable investments. While lower greenwashing beliefs display indirect effects on sustainable investments in the incentivized decision and in the self-reported share of sustainable investments (however, only significant at the 0.10 level), the hassle factor relates to lower self-reported sustainable investments. Again, the direct effects dominate the indirect effects, both in the incentivized decision and in the self-reported investments (Table B.8., Panel B). The combined indirect

effect of both mediators is about 5 percent in incentivized decisions, and about 12 percent in the self-reported sustainable investments.

Third, we propose a mediation model where the relationship between SFL and potentially greenwashed investments (incentivized and self-reported) is mediated by the subjective ability to identify greenwashing, and, again, by greenwashing beliefs. The potential mechanisms behind this decrease in greenwashed investments could be that SFL relates to the ability to differentiate between genuinely sustainable products and those merely masquerading as such, or that it relates with perceptions that sustainable investments constitute greenwashing per se. Heeb et al. (2023) suggest that investors' concern about the impact of their investment is limited and that investors do not differentiate between a weakly and a more strongly sustainable product. Other studies highlight the adverse effects of greenwashing on investment intentions (Gatti et al., 2021) and show that investors are indeed willing to sacrifice returns to avoid greenwashing (Kleffel & Muck, 2023). Survey studies show that socially motivated investors in particular are concerned about greenwashing (Degryse et al., 2023). We conjecture that investors with higher SFL may be less susceptible to greenwashing, since they are aware of the risk of investing in a greenwashed product and can effectively analyze information to ensure that a product aligns with their sustainability preferences. We find significant negative direct effects of SFL on potentially greenwashed investments (Table B.8., Panel C). Indirect effects are only significant for greenwashing beliefs on the steps to avoid greenwashing.

Table B.8. Mediation analyses on the direct and indirect effect of SFL on investment behavior.

Panel A: SFL and stock market investments				
	SMI incentivized		SMI self-reported	
	Coefficient	% of total	Coefficient	% of total
Direct effect				
SFL	0.320***	87.43	0.145***	75.13
Indirect effect				
Image: Immorality	0.029***	7.92	0.023***	11.92
Image: ESG	-0.001	0.27	-0.000	0.00
Image: Wealth creating	0.007*	1.91	0.011**	5.70
Stockholder image	0.011*	3.00	0.015***	7.77
Combined indirect effect	0.047	12.84	0.048	24.87
Total (direct + indirect)	0.366		0.193	

N	1,510		1,510	
Panel B: SFL and sustainable investments				
	SI incentivized		SI self-reported	
	Coefficient	% of total	Coefficient	% of total
Direct effect				
SFL	0.314***	95.73	0.127***	88.19
Indirect effect				
Hassle factor	0.005	1.52	0.014**	9.72
Greenwashing beliefs	0.010*	3.05	0.003^{+}	2.08
Combined indirect effect	0.015	4.57	0.017	11.81
Total (direct + indirect)	0.328		0.144	
N	1,510		1,510	
Panel C: SFL and potentially greenwashed investments				
	GW incentivized		GW self-reported	
	Coefficient	% of total	Coefficient	% of total
Direct effect				
SFL	-0.183***	103.39	-0.159***	89.83
Indirect effect				
Subjective ability to identify greenwashing	0.005	-2.82	-0.028*	15.82
Greenwashing beliefs	0.001	-0.56	0.004	-2.26
Combined indirect effect	0.006	-3.39	-0.024	13.56
Total (direct + indirect)	-0.177		-0.183	
N	1,081		1,081	

Note. Table B.8., Panel A, reports the direct and indirect effects of SFL on stock market investments (incentivized and self-reported). Table B.8., Panel B, reports the effects on investments in sustainably marketed funds, and Panel C the effects on identification of a fund that faced greenwashing allegation. Note that self-reported stock market investments and sustainable investments were transformed to be from 0 to 1 (before: 0 to 4 or 5, in categories). $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Appendix B.5. Robustness checks

As a robustness check, we exclude all participants from the full sample who did not provide an email address and chose not to accept the incentive (N = 290). Moreover, we exclude participants who answered *I don't know* on all SFL questions (N = 129) or the advanced financial literacy questions (N = 85). We also exclude participants who spend less than 30 seconds for the investment decision (N = 54) or the SFL questions (N = 59). Since in some cases more than one of these exclusion criteria applied, we have a sample of N = 1057 participants for the robustness check of the relationship between SFL and stock market investments as well as sustainable investments in the investment decision.

We replicate the analyses on stock market investments reported in Table 4 with the reduced sample and find that the estimates of SFL are robust to these specifications (Table B.9, Models (1) to (4)). Testing for coefficient equality of SFL and advanced financial literacy, however, results in no significant differences in Models (3) and (4), with $p > 0.365$ in all tests. We furthermore again calculate two step-regression analyses. In the first step, we include advanced financial literacy (Model (1)) and in the second step we add SFL (Model (3)). Results show that Model (1) explains $R^2 = 0.023$ of variance and Model (3) explains $R^2 = 0.038$, which is a significant increase in additional explained variance due to the inclusion of SFL (ΔR^2: $F(1054,1) = 17.46$, $p < 0.001$).

We replicate the analyses on sustainable investments reported in Table 5 with the reduced sample and find that the estimates of SFL are robust to these specifications (Table B.9, Models (5) to (8)). Testing for coefficient equality of SFL and advanced financial literacy results in significant differences in Models (7) and (8) with $p < 0.005$ in all tests. We again calculate two step-regression analyses. In the first step, we include advanced financial literacy (Model (5)) and in the second we add SFL (Model (7)). We find that Model (5) explains $R^2 = 0.005$ of the variance and Model (7) explains $R^2 = 0.030$, which is a significant increase in additional explained variance due to the inclusion of SFL (ΔR^2: $F(1054,1) = 27.40$, $p < 0.001$).

As a robustness check for the relationship between SFL and potentially greenwashed investments, we use the sample of the robustness check while, as done for the main analyses, excluding all participants who did not invest sustainably in the investment decision ($N = 262$). Thus, for this robustness check we have a sample of $N = 795$ participants. Using this reduced sample, we replicate the analyses on potentially greenwashed investment reported in Table 6 and find that the estimates of SFL are robust to these specifications (Table B.9, Models (9) to (12)). Testing for coefficient equality of SFL and advanced financial literacy results in insignificant differences in Models (11) and (12), with *p*-values of $p = 0.121$ and $p = 0.094$. We again calculate two step-regression analyses. In the first step, we include advanced financial literacy (Model (9)) and in the second we add SFL (Model (11)). We find that Model (9) explains $R^2 = 0.007$ of the variance and Model (11) explains $R^2 = 0.020$, which is a significant increase in additional explained variance due to the inclusion of SFL (ΔR^2: $F(792,1) = 11.49$, $p < 0.001$).

Table B.9. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (7 questions).

	Stock market investments				Sustainable investments				Potentially greenwashed investments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SFL		0.225***	0.176***	0.106*		0.275***	0.265***	0.239***		-0.187***	-0.165***	-0.137**
		(0.039)	(0.042)	(0.043)		(0.047)	(0.051)	(0.050)		(0.045)	(0.049)	(0.052)
Advanced financial literacy	0.173***		0.117**	0.074*	0.107*		0.022	0.028	-0.100**		-0.050	-0.011
	(0.034)		(0.037)	(0.037)	(0.042)		(0.044)	(0.044)	(0.039)		(0.041)	(0.043)
Female (Ref.: male)				-0.036+				0.010				0.019
				(0.020)				(0.024)				(0.023)
Age in years				0.000				-0.001				-0.001
				(0.001)				(0.001)				(0.001)
University degree (Ref.: no)				-0.004				0.000				-0.008
				(0.025)				(0.029)				(0.028)
High household income				0.010				-0.013				-0.026
				(0.022)				(0.026)				(0.026)
Household income not reported				0.014				0.081*				0.018

Table B.9. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (7 questions).

	Stock market investments				Sustainable investments				Potentially greenwashed investments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
				(0.027)				(0.031)				(0.031)
Investment experience in years				-0.006				-0.007				-0.011*
				(0.004)				(0.005)				(0.005)
Constant	0.631***	0.634***	0.574***	0.477***	0.434***	0.361***	0.349***	-0.153	0.492***	0.525***	0.550***	0.732***
	(0.027)	(0.024)	(0.030)	(0.098)	(0.033)	(0.029)	(0.036)	(0.115)	(0.031)	(0.028)	(0.035)	(0.115)
Additional	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
N	1057	1057	1057	1057	1057	1057	1057	1057	795	795	795	795
R2	0.023	0.030	0.039	0.123	0.006	0.031	0.031	0.158	0.008	0.021	0.023	0.057
R2 Adj.	0.023	0.029	0.038	0.106	0.005	0.030	0.030	0.142	0.007	0.020	0.020	0.032

Note. This table presents the robustness checks of the hierarchical models regressing stock market investments, sustainable investments, and potentially greenwashed investments on SFL, successively adding control variables. Additional control variables in Models (4), (8) and (12): Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.10. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (5 questions).

	Stock market investments				Sustainable investments				Potentially greenwashed investments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SFL (5 questions)		0.324***	0.251***	0.147***		0.294***	0.271***	0.221***		-0.131***	-0.096**	-0.075^{+}
		(0.029)	(0.033)	(0.034)		(0.032)	(0.036)	(0.037)		(0.032)	(0.036)	(0.038)
Advanced financial literacy	0.243***		0.142***	0.095**	0.155***		0.045	0.053^{+}	-0.107***		-0.071*	-0.034
	(0.026)		(0.029)	(0.029)	(0.029)		(0.032)	(0.032)	(0.028)		(0.031)	(0.033)
Female (Ref.: male)				-0.036*				0.025				0.002
				(0.018)				(0.020)				(0.020)
Age in years				0.000				-0.001*				-0.001
				(0.001)				(0.001)				(0.001)
University degree (Ref.: no)				-0.013				-0.022				-0.027
				(0.024)				(0.026)				(0.026)
High household income				0.005				-0.009				-0.021
				(0.020)				(0.022)				(0.023)

Table B.10. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (5 questions).

	Stock market investments			Sustainable investments				Potentially greenwashed investments			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Household income not reported				-0.022				0.026				0.006
				(0.023)				(0.025)				(0.026)
Investment experience in years				-0.006				-0.004				-0.008^{+}
				(0.004)				(0.004)				(0.004)
Constant	0.548***	0.557***	0.498***	0.462***	0.378***	0.343***	0.324***	-0.073	0.508***	0.501***	0.532***	0.690***
	(0.019)	(0.016)	(0.020)	(0.081)	(0.021)	(0.018)	(0.022)	(0.089)	(0.021)	(0.019)	(0.023)	(0.092)
Additional	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
N	1510	1510	1510	1510	1510	1510	1510	1510	1081	1081	1081	1081
R2	0.054	0.074	0.089	0.182	0.019	0.053	0.054	0.159	0.013	0.015	0.020	0.043
R2 Adj.	0.053	0.074	0.088	0.171	0.018	0.052	0.053	0.147	0.012	0.014	0.018	0.025

Note. This table presents the robustness checks of the hierarchical models regressing stock market investments, sustainable investments, and potentially greenwashed investments on the 5-question SFL inventory, successively adding control variables. Additional control variables in Models (4), (8) and (12): Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B.11. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (7 questions) by gender.

	Stock market investments			Sustainable investments			Potentially greenwashed investments		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full sample	Male	Female	Full sample	Male	Female	Full sample	Male	Female
SFL	0.187***	0.140**	0.232***	0.251***	0.274***	0.235***	-0.134**	-0.138*	-0.124*
	(0.035)	(0.050)	(0.050)	(0.039)	(0.057)	(0.052)	(0.041)	(0.059)	(0.057)
Advanced financial literacy	0.084**	0.124**	0.052	0.045	-0.038	0.111*	-0.018	-0.040	0.008
	(0.030)	(0.043)	(0.041)	(0.032)	(0.049)	(0.043)	(0.033)	(0.048)	(0.046)
Female (Ref.: male)	-0.037*			0.021			0.002		
	(0.018)			(0.020)			(0.020)		
Age in years	0.000	-0.001	0.001	-0.001*	-0.002*	0.000	-0.001	0.001	-0.002*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
University degree (Ref.: no)	-0.013	-0.027	-0.006	-0.021	-0.010	-0.039	-0.025	0.016	-0.080*
	(0.024)	(0.033)	(0.035)	(0.026)	(0.038)	(0.036)	(0.026)	(0.036)	(0.037)
High household income	0.006	-0.011	0.023	-0.007	-0.013	-0.009	-0.023	-0.033	-0.003
	(0.020)	(0.027)	(0.031)	(0.022)	(0.031)	(0.032)	(0.023)	(0.030)	(0.034)
Household income not reported	-0.016	-0.019	-0.012	0.033	-0.025	0.069*	0.000	0.010	-0.002
	(0.023)	(0.034)	(0.032)	(0.025)	(0.039)	(0.033)	(0.026)	(0.040)	(0.035)
Investment experience in years	-0.006	-0.006	-0.005	-0.004	0.001	-0.008	-0.008+	-0.009	-0.008
	(0.004)	(0.005)	(0.006)	(0.004)	(0.006)	(0.006)	(0.004)	(0.006)	(0.006)
Constant	0.462***	0.442***	0.481***	-0.067	0.013	-0.076	0.698***	0.674***	0.663***
	(0.081)	(0.108)	(0.120)	(0.088)	(0.123)	(0.125)	(0.091)	(0.127)	(0.130)

Table B.11. OLS-regression of stock market investments, sustainable investments, and potentially greenwashed investments on SFL (7 questions) by gender.

	Stock market investments			Sustainable investments			Potentially greenwashed investments		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Full sample	Male	Female	Full sample	Male	Female	Full sample	Male	Female
Additional controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	1510	737	773	1510	737	773	1081	520	561
R2	0.186	0.163	0.203	0.162	0.147	0.217	0.050	0.059	0.082
R2 Adj.	0.175	0.140	0.183	0.150	0.124	0.197	0.032	0.023	0.050

Note. This table presents the main analyses from Table 4, Table 5 and Table 6, regressing stock market investments, sustainable investments, and potentially greenwashed investments on SFL, separated by gender. Additional control variables in all models: Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix B.6. Robustness check: Financial market participants vs. non-participants

We re-estimate the Models from Table 4 through 6, separating the sample into financial market participants (N = 654) and non-financial market participants (N = 856) and therefore excluding investment experience as a control variable in the second subsample.

Within the sample of financial market participants, we find similar relationship between SFL and stock market investments as in the full sample (Table 4). The estimates for SFL are lower but remain significant for all Models in Table B.12 except for Model (4), with coefficients of about 0.10 on average, i.e., about 10 percentage points higher financial market investments. As before, the two-step regression analysis show that with the introduction of SFL as a predictor, the total variance explained in stock market investments significantly increases (ΔR^2: $F(651,1) = 11.377$, $p < 0.001$). The Wald test for coefficient equality shows that the estimates of SFL are higher in Model (3) ($p = 0.030$) but not significantly different in Model (4) ($p > 0.306$).

With the sample of non-financial market participants (N = 856), without experience as a predictor variable, we find similar coefficients as in the main model on stock market investments (Table 4). Two-step regressions show an increase in variance explained with the introduction of SFL (ΔR^2: $F(853,1) = 39.597$, $p < 0.001$). The Wald tests show that the estimates for SFL are slightly higher than those for advanced financial literacy (Model (7): $p = 0.043$, Model (8): $p = 0.105$).

Also, using the subsample of financial market participants, the estimate for SFL and sustainable investments are similar as in the full sample (Table 5), with an increase of about 23 percentage points in sustainable investments across all Models given high SFL (Table B.13). The estimates for advanced financial literacy are insignificant. Two-step regressions show an increase in total variance explained with the introduction of SFL (ΔR^2: $F(651,1) = 13.539$, $p < 0.001$). Wald tests show that the coefficients of advanced financial literacy are lower across Models (3) and (4) (all $p < 0.02$).

With the sample of non-financial market participants (N = 856), without experience as a predictor variable, we find similar coefficients as in the main model on sustainable investments. Two-step regressions show an increase in total variance explained with the introduction of SFL (ΔR^2: $F(853,1) =$

48.491, $p < 0.001$). The Wald tests show that the coefficient estimates for SFL are higher than those for advanced financial literacy (Models (7) to (8) $p < 0.01$).

Among financial market participants, again excluding those who have not invested sustainably in the investment decision (Table B.14.; $N = 511$), we find that the estimates of the effect of SFL on potentially greenwashed investments are only significantly negative in Model (2) and not in Models (3) and (4). Two-step regressions show no increase in variance explained with the introduction of SFL (ΔR^2: $F(508,1) = 0.9148$, $p = 0.333$). We find no difference between the effect sizes of SFL and advanced financial literacy (all $p > 0.55$).

With the sample of non-financial market participants who have invested sustainably in the incentivized decision ($N = 570$), without experience as a predictor variable, we find similar coefficients as in the main model on potentially greenwashed investments (Table 6). Two-step regressions show an increase in total variance explained with the introduction of SFL (ΔR^2: $F(567,1) = 18.524$, $p < 0.001$). The Wald tests show that the estimates for SFL are higher than those for advanced financial literacy (Models (7) and (8) $p < 0.01$).

Table B.12. OLS-regression of stock market investments on SFL by financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SFL		0.161***	0.159***	0.071		0.391***	0.308***	0.236***
		(0.044)	(0.047)	(0.049)		(0.044)	(0.049)	(0.050)
Advanced financial literacy	0.052		0.003	-0.002	0.270***		0.152***	0.112**
	(0.037)		(0.039)	(0.040)	(0.037)		(0.041)	(0.042)
Female (Ref.: male)				-0.037				-0.041
				(0.024)				(0.026)
Age in years				0.0002				-0.0003
				(0.0008)				(0.0008)
University degree (Ref.: no)				-0.032				0.022
				(0.027)				(0.040)
High household income				0.037				-0.028
				(0.024)				(0.033)
Household income not reported				0.011				-0.016
				(0.031)				(0.033)
Investment experience in years				-0.012*				
				(0.005)				
Contant	0.766***	0.713***	0.711***	0.682***	0.479***	0.470***	0.417***	0.372***
	(0.030)	(0.028)	(0.034)	(0.109)	(0.025)	(0.022)	(0.026)	(0.116)
Additional controls	NO	NO	NO	YES	NO	NO	NO	YES
N	654	654	654	654	856	856	856	856

Table B.12. OLS-regression of stock market investments on SFL by financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R2	0.003	0.020	0.020	0.122	0.057	0.085	0.099	0.179
R2 adj.	0.002	0.019	0.017	0.094	0.056	0.084	0.097	0.160

Note. This table presents the results of hierarchical models regressing stock market investments on SFL, successively adding control variables and splitting the sample into financial market participants and non-participants. Additional control variables in Models (4) and (8): Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B.13. OLS-regression of sustainable investments on SFL by reported financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SFL		0.219***	0.226***	0.220***		0.378***	0.349***	0.258***
		(0.057)	(0.061)	(0.064)		(0.045)	(0.050)	(0.050)
Advanced financial literacy	0.055		-0.014	-0.008	0.187***		0.054	0.060
	(0.048)		(0.051)	(0.052)	(0.039)		(0.042)	(0.042)
Female (Ref.: male)				0.018				0.026
				(0.031)				(0.026)
Age in years				-0.0007				-0.002*
				(0.001)				(0.0008)
University degree (Ref.: no)				-0.021				-0.010
				(0.035)				(0.040)
High household income				0.010				-0.030

Table B.13. OLS-regression of sustainable investments on SFL by reported financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				(0.031)				(0.033)
Household income not reported				0.044				0.035
				(0.041)				(0.033)
Investment experience in years				-0.002				
				(0.007)				
Contant	0.477***	0.393***	0.400***	0.092	0.342***	0.291***	0.272***	-0.146
	(0.039)	(0.036)	(0.044)	(0.141)	(0.026)	(0.023)	(0.027)	(0.116)
Additional controls	NO	NO	NO	YES	NO	NO	NO	YES
N	654	654	654	654	856	856	856	856
R2	0.002	0.022	0.022	0.121	0.027	0.077	0.079	0.195
R2 adj.	0.0005	0.021	0.019	0.093	0.026	0.076	0.077	0.177

Note. This table presents the results of hierarchical models regressing sustainable investments on SFL, successively adding control variables and splitting the sample into financial market participants and non-participants. Additional control variables in Models (4) and (8): Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B.14. OLS-regression of potentially greenwashed investments on SFL by reported financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SFL		-0.109*	-0.056	-0.047		-0.227***	-0.222***	-0.221***
		(0.054)	(0.059)	(0.064)		(0.046)	(0.052)	(0.054)
Advanced financial literacy	-0.125**		-0.108*	-0.068	-0.089*		-0.009	0.022
	(0.043)		(0.046)	(0.050)	(0.039)		(0.043)	(0.045)
Female (Ref.: male)				-0.009				0.026
				(0.030)				(0.027)
Age in years				-0.0006				-0.0004
				(0.001)				(0.0008)
University degree (Ref.: no)				-0.010				-0.056
				(0.034)				(0.041)
High household income				-0.035				-0.017
				(0.030)				(0.036)
Household income not reported				-0.025				0.018
				(0.039)				(0.036)
Investment experience in years				-0.015*				
				(0.007)				
Contant	0.519***	0.489***	0.540***	0.714***	0.500***	0.552***	0.555***	0.670***
	(0.035)	(0.035)	(0.041)	(0.135)	(0.027)	(0.025)	(0.030)	(0.127)
Additional controls	NO	NO	NO	YES	NO	NO	NO	YES
N	511	511	511	511	570	570	570	570
R2	0.017	0.008	0.018	0.059	0.009	0.040	0.040	0.075

Table B.14. OLS-regression of potentially greenwashed investments on SFL by reported financial market investments.

	Financial market participants				Non-participants			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R2 adj.	0.015	0.006	0.015	0.020	0.007	0.039	0.037	0.043

Note. This table presents the results of hierarchical models regressing potentially greenwashed investments on SFL, successively adding control variables and splitting the sample into financial market participants and non-participants. Additional control variables in Models (4) and (8): Stockholder image, stock market image: immorality, stock market image: wealth creating capacity, stock market image: ESG image, hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix B.7. External validity: Self-reported investment behavior

The results of ordered probit regressions in Table B.15 show that SFL relates to more self-reported financial market investments in Models (2) and (3), while the estimates are not significant in Model (4). Estimates for advanced financial literacy are significant in Model (1) and (3) and also turn nonsignificant when adding more control variables. Among those, particularly investment experience and perceived wealth creating capacity are strong predictors. The odds for being in a higher category of holding stock market products (1 = *1 to 24%,* 2 = *25 to 50%*, 3 = *51 to 75%*, 4 = *76 to 99%*, 5 = *100%*) are 4.15 times higher with high SFL in Model (3) and 1.03 times higher in Model (4). The odds ratios for advanced financial literacy are 3.20 in Model (3) and 1.24 in Model (4). The Wald tests for coefficient equality indicate no significant differences between SFL and advanced financial literacy (all Wald-tests $p > 0.43$). Stock market investments in the incentivized decision and self-reported financial market investments are correlated ($r_s = 0.25$, $p < 0.001$).

With greater SFL, participants report owning a larger share of sustainable investments across Models (6) to (8) in Table B.15. Estimates for advanced financial literacy are significant in Models (5) and (7). The odds for being in a higher category of holding sustainable investments (1 = *0% - I do not own sustainable assets*, 2 = *1 to 24%*, 3 = *51 – 75%*, 4 = *76 – 99%*, 5 = *100% - I only own sustainable assets*) are 6.90 times higher with high SFL in Model (7) and 2.48 times higher in Model (8). The odds ratios for advanced financial literacy are 1.58 in Model (7) and 0.83 in Model (8). The Wald tests for coefficient equality indicate that the estimates of SFL are higher (all Wald-test $p < 0.001$) than those for advanced financial literacy across all relevant models (Models (5) to (8). Sustainable investments in the incentivized decision and self-reported ownership of sustainable investments are correlated ($r_s = 0.18$, $p < 0.001$).

With greater SFL, participants are less likely to forgo seeking additional information to ensure the sustainability promises of an ESG investment are true and greenwashing is avoided, as shown in Table B.15 ($N = 464$, as only participants who own sustainable investments are included, in line with the Models in Table 5). The estimates of SFL are significant across all Models, while those of advanced financial literacy are only significant when it is included as the single predictor in Model (1). The odds

for being in a higher category of less information seeking (1 = *always*, 5 = *never* (reversed)) are lower (odds ratio Model (11) = 0.41, odds ratio Model (12) = 0.41) with high SFL. The odds ratios for advanced financial literacy are 0.67 in Model (11) and 0.86 in Model (12). The Wald tests for coefficient equality indicate no significant differences between SFL and advanced financial literacy (all $p > 0.23$).

Table B.15. POLR-regression of self-reported financial market investments, sustainable investments, and greenwashed investment on SFL (7 questions).

	Financial market investments				Sustainable investments				Greenwashed investment			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SFL		2.001***	1.423***	0.028		2.169***	1.931***	0.910***		-1.120**	-0.900*	-0.885*
		(0.191)	(0.211)	(0.249)		(0.218)	(0.241)	(0.275)		(0.341)	(0.378)	(0.420)
Advanced FL	1.695***		1.163***	0.211	1.170***		0.459*	-0.191	-0.718**		-0.406	-0.150
	(0.168)		(0.184)	(0.214)	(0.180)		(0.199)	(0.229)	(0.270)		(0.301)	(0.327)
Female (Ref.: male)				-0.146				0.078				-0.118
				(0.126)				(0.136)				(0.189)
Age in years				-0.014***				-0.017***				-0.009
				(0.004)				(0.004)				(0.006)
University degree (Ref.: no)				0.115				0.019				0.150
				(0.153)				(0.164)				(0.219)
High household income				0.195				0.334*				-0.048
				(0.133)				(0.143)				(0.193)
Household income not reported				-0.029				0.042				-0.163
				(0.164)				(0.178)				(0.262)

Table B.15. POLR-regression of self-reported financial market investments, sustainable investments, and greenwashed investment on SFL (7 questions).

	Financial market investments					Sustainable investments				Greenwashed investment		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Investment experience				0.476***				0.348***				-0.003
				(0.027)				(0.028)				(0.046)
Stockholder image				-0.134**				-0.033				-0.046
				(0.051)				(0.056)				(0.079)
Image: Immorality				-0.035				0.102*				-0.143*
				(0.046)				(0.051)				(0.071)
Image: Wealth creating				-0.157***				-0.017				-0.006
				(0.046)				(0.049)				(0.071)
Image: ESG				-0.078^{+}				-0.172***				-0.053
				(0.045)				(0.048)				(0.073)
Additional	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
N	1510	1510	1510	1510	1510	1510	1510	1510	464	464	464	464
Nagelkerke pseudo R2	0.08	0.08	0.11	0.48	0.04	0.08	0.09	0.31	0.02	0.03	0.03	0.12

Note. This table presents the robustness checks of the hierarchical ordered probit models regressing stock market investments, sustainable investments, and greenwashed investment identification on SFL, successively adding control variables. Additional control variables in Models (4), (8) and (12): Hassle factor, greenwashing beliefs, biospheric values, altruistic values, risk taking, patience, general trust, left wing views. $^{+}$ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001.

Appendix B.8. Revised investment decisions (Study 2)

This section explores changes in participants' investment decisions after they have learnt about the greenwashing allegations against one fund. Overall, 734 (67.90%) of the participants that invested in the sustainably marketed funds (N = 1,081) did not change their investment at all and 776 (71.79%) did not change their investment in the allegedly greenwashed Fund C in the revised investment decision. The majority of the participants who revised their decision (78.54%) had previously invested in the potentially greenwashed fund. Considering those participants who changed their initial investment in the revised investment decision, we find that both stock market investments (-3.7 percentage points) and sustainable investments (-6.9 percentage points) are significantly lower after learning about greenwashing allegations regarding Fund C (initial investments, differences in the revised investment decision, and test statistics are reported in Table B.16). Namely, participants reduce their investments in the potentially greenwashed Fund C by 105.86 euros, a reduction of 69.74% compared to the initial investment in this fund. In turn, investments in the sustainable Fund D increase by 74.22 euros, an increase of 51.07% compared to the initial investment in this fund, as do allocations to the savings account (18.32 euros or 22.04%). Investments in the conventional Funds A and B do not change materially.

Table B.16. Initial investment decision and differences in the revised investment decision.

	N	*M*	*SD*	Difference	*p*-value paired *U*-test
All participants with ESG investments					
Stock market investments	1,081	83.1%	19.7%	-1.2pp	< 0.001
Sustainable investments	1,081	67.2%	26.4%	-2.2pp	< 0.001
Potentially greenwashed investment	1,081	43.5%	30.3%	-11.41pp	< 0.001
Investment Fund A	1,081	€70.20	€77.10	€2.47	0.054
Investment Fund B	1,081	€68.22	€78.92	€1.80	0.064
Investment Fund C	1,081	€116.21	€106.28	-€33.98	< 0.001
Investment Fund D	1,081	€161.06	€131.53	€23.83	< 0.001
Investment Savings Account	1,081	€84.30	€98.64	€5.88	< 0.001
Participants with changes in revision					
Stock market investments	347	83.4%	19.0%	-3.7pp	< 0.001
Sustainable investments	347	71.9%	25.3%	-6.9pp	< 0.001

Table B.16. Initial investment decision and differences in the revised investment decision.

	N	*M*	*SD*	Difference	*p*-value paired *U*-test
Potentially greenwashed investment	347	52.4%	28.8%	-35.6pp	< 0.001
Investment Fund A	347	€62.01	€73.56	€7.70	0.054
Investment Fund B	347	€57.67	€74.85	€5.61	0.064
Investment Fund C	347	€151.79	€110.29	-€105.86	< 0.001
Investment Fund D	347	€145.34	€113.38	€74.22	< 0.001
Investment Savings Account	347	€83.13	€94.99	€18.32	< 0.001

Note. This table presents the initial investments of all participants who invested in the sustainably marketed funds and those who adapted their investment decision in the revised decision. *N* = number of observations, *M* = mean of the initial investment decision, *SD* = standard deviation of the initial investment decision. Percentages of the outcome variables on investments do not always perfectly align with the values in euros as the percentages exclude divisions by zero.

We analyze the determinants (Table B.17. in the Appendix) of changing the investment in the potentially greenwashed fund. OLS regression Models (1) and (2) use the amount of the reduction (i.e., the difference in Fund C investment between the initial and the revised decisions) as outcome the variable; logit regression Model (3) uses a binary indicator of whether the investment in Fund C was reduced. The results show having invested in the potentially greenwashed fund is the strongest predictor of the decision to revise the investment. Also, sustainable investing for an ESG reason, e.g., impact on ESG factors rather than financial returns, is a strong predictor for reduced potentially greenwashed investments. Financial reasons were stated by 66.49% of participants, and non-financial reasons by 33.51%. Among those who invested sustainably in the incentivized decision, these percentages amount to 61.89% and 38.11%, respectively.

Table B.17. Reasons for reducing potentially greenwashed investment

	Difference in Fund C	Fund C reduced (binary)
	(1)	(2)	(3)
Stock market investments: initial		-49.527***	-0.656
		(12.020)	(0.431)
Sustainable investments: initial		-86.297***	-1.190***
		(9.514)	(0.334)
Potentially greenwashed investments: initial		-124.822***	-2.937***

Table B.17. Reasons for reducing potentially greenwashed investment

	Difference in Fund C		Fund C reduced (binary)
	(1)	(2)	(3)
		(7.669)	(0.286)
SFL	10.002	0.726	-0.678+
	(11.653)	(10.233)	(0.357)
Advanced financial literacy	-10.630	-7.638	-0.599*
	(9.401)	(8.216)	(0.290)
ESG reason	-22.332***	-13.131**	-0.575***
	(5.667)	(5.081)	(0.171)
Female (Ref.: male)	2.130	1.169	0.058
	(5.692)	(4.982)	(0.172)
Age in years	0.109	0.119	0.006
	(0.176)	(0.154)	(0.005)
University degree (Ref.: no)	2.681	-0.378	-0.115
	(7.444)	(6.494)	(0.216)
High household income	-9.309	-10.150+	-0.311
	(6.498)	(5.672)	(0.195)
Household income not reported	2.105	5.318	-0.152
	(7.459)	(6.517)	(0.222)
Investment experience in years	0.677	-0.406	0.041
	(1.215)	(1.061)	(0.037)
Stockholder image	-0.078	1.166	-0.036
	(2.460)	(2.148)	(0.075)
Stock market image: Immorality	-0.779	-1.020	-0.031
	(2.212)	(1.929)	(0.067)
Stock market image: Wealth creating	-0.956	-1.961	-0.122+
	(2.180)	(1.908)	(0.066)
Stock market image: ESG	1.483	0.785	0.062
	(2.128)	(1.863)	(0.064)
Hassle factor	-2.789	-2.958+	-0.097
	(2.030)	(1.770)	(0.062)
Greenwashing beliefs	0.200	-1.338	0.024
	(2.493)	(2.177)	(0.075)
Biospheric Values	-2.229	-0.334	-0.024
	(3.172)	(2.783)	(0.102)
Altruistic Values	-1.951	-4.762+	-0.263**
	(3.056)	(2.673)	(0.099)

Table B.17. Reasons for reducing potentially greenwashed investment

	Difference in Fund C		Fund C reduced (binary)
	(1)	(2)	(3)
Risk taking	1.712	2.159	0.011
	(2.241)	(1.979)	(0.069)
Patience	-4.565+	-3.062	-0.111
	(2.479)	(2.164)	(0.077)
General trust	-0.604	0.717	0.018
	(1.903)	(1.680)	(0.057)
Left wing views	-4.852*	-2.612	-0.077
	(2.257)	(1.984)	(0.070)
Constant	63.633*	204.051***	8.296***
	(26.328)	(25.618)	(0.962)
N	1081	1081	1081
R2	0.045	0.276	
R2 adj.	0.026	0.259	

Note. This table presents the determinants of the absolute difference in the revision of the investment decision (Models (1) and (2)) as well as a binary outcome variable whether the investment was revised (Model (3)) after learning about greenwashing allegations regarding Fund C. Standard errors are shown in parentheses. $^{+}$ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Appendix C. Questionnaire Study 1 (translated from German)

Table C.1.

PAGE	TEXT (Particpants‘ View)	Scale
Welcome	Dear Sir or Madam, in this questionnaire, we, the [name of the institute] are interested in the topic of financial investments. The participation takes about 12 minutes. By conscientiously and completely filling in the questionnaire, you are making a significant contribution to our scientific research! Thank you very much for your support. [names and contact of authors]	
Data protection	Data protection Your rights and information on data protection - The security of your data is important to us! By confirming the stated conditions at the bottom of this page, you can proceed to the questionnaire.	

	[Data protection agreement] I hereby confirm that I agree and consent to the above conditions.	
	Filter for quota	
	Before you begin, three quick questions about yourself.	
Gender *[gender]*	Which gender do you feel you belong to? 1. Male 2. Female 3. Non-binary, transgender, other	
Age *[age]*	Please indicate your age in years: [open answer format from 14 to 100 years]	*[below 18y will be excluded]*
	Self-rated (Sustainable) Financial Knowledge	
Self-rated basic *[subjective_basic_FL]*	How much do you think you know about the following topics compared to the Austrian population? Money matters	Similiar to Riitsalu 2019; (1 = very low, 7 = very high)
Self-rated advanced FL *[subjective_advanced_FL]*	Investments and the stock market	Similar to Gutsche 2020 and Dobni 2015; (1 = very low, 7 = very high)
Self-rated SFL *[subjective_SFL]*	Sustainable investments	Similiar to Brunen 2022 Gutsche 2020; (1 = very low, 7 = very high)
Self-rated sustainability literacy *[subjective_SL]*	Environmental and sustainability issues	(1 = very low, 7 = very high)
	Sustainable Finance Literacy [randomized question order]	
Sustainable Finance Literacy	Please indicate how likely it is that these statements are incorrect or correct. [30 questions; for all questions see Table A.2. in Appendix A.1. Additionally, one attention check is included (*Please select "definitely correct" here. This is a test question*)]	1 = definitely wrong, 2 = somewhat wrong, 3 = undecided, 4 = somewhat correct, 5 = definitely correct, 6 = I don't know

	Financial Literacy [randomized question order]	[Big Three]
Basic Fin. Literacy *[FL_basic]*	Now we are interested in your financial knowledge.	
Compound interest [FL_b_compound_interest]	Suppose you had 100 € in a savings account, the interest rate was 2 percent per year, and you leave the money in this account for 5 years. How much do you think you would have in the account after 5 years: 1. More than 110 EUR 2. <u>Exactly 110 EUR</u> 3. Less than 110 EUR 4. I don't know	Lusardi 2008 Q1, Also in van Rooij Q2; OECD 2022 QK6
Real interest rate *[FL_b_real_interest]*	Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. How much could you buy with the money in your account after one year? (Assuming you do not have to pay an account maintenance charge) 1. More than today, 2. Exactly the same as today or 3. <u>Less than today</u> 4. I don't know	Lusardi 2008 Q2, Also in van Rooij Q3; Fessler 2019
Risk *[FL_b_risk]*	Do you agree with the following statement: "Buying a single company stock usually provides a safer return than investing in a fund with shares of similar companies"? 1. I agree 2. <u>I disagree</u> 3. I don't know	Lusardi 2008 Q3
	Advanced FL / Stock market literacy [randomized question order]	[three highest loading factors of advanced lit in van Rooij 2011]
Advanced Fin. Literacy *[FL_advanced]*	Next, we are interested in your knowledge of the stock market.	
Stock market *[FL_a_stock_market]*	Which of the following statements describes the main function of the stock market? 1. The stock market helps to predict stock earnings. 2. The stock market results in an increase in the price of stocks. 3. <u>The stock market brings people who want to buy stocks together with those who want to sell stocks.</u> 4. I don't know	Van Rooij adv. Q6; also used in Balloch 2015 Q1;

Mutual funds *[FL_a_mutual_funds]*	Which of the following statements is correct? 1. Once one invests in a mutual fund, one cannot withdraw the money in the first year. 2. <u>Mutual funds can invest in several assets, for example invest in both stocks and bonds.</u> 3. Mutual funds pay a guaranteed rate of return which depends on their past performance. 4. None of the above 5. I don't know	Van Rooij adv. Q8; also used in Balloch 2015 Q9;
Value volatility *[FL_a_volatility]*	Normally, which asset displays the highest fluctuations over time? 1. Savings accounts 2. Bonds 3. <u>Stocks</u> 4. I don't know	Van Rooij adv. Q11; Also used in Balloch 2015 Q4;
	Sustainability literacy [randomized question order]	
Sustainability literacy *[sust_literacy]*	Now we are interested in your knowledge about sustainability.	
Climate change *[SL_clim_change]*	Is the following statement true or false: „Climate change is mainly caused by natural processes and not by human activities." 1. True 2. <u>False</u> 3. I don't know	
Sustainable Development goals *[SL_SDGs]*	Which of the following topics are part of the United Nations Sustainable Development Goals (SDGs)? Multiple answers possible. 1. <u>Good Health and Well-Being</u> 2. <u>Climate Action</u> 3. <u>Partnerships for the Goals</u> 4. I don't know	Filippini 2024
Definition Sustainability *[SL_sustainability]*	In your opinion, which of the following definitions best describes sustainable development? 1. Ensuring universal access to education, health and social services. 2. Constant economic growth while simultaneously minimising the impacts on climate change. 3. <u>Meeting today's needs without compromising future generations.</u> 4. I don't know	Filippini 2024; Zwickle 2013
	Financial Attitudes	
	Please indicate to what extent you agree with the following statements.	

Hassle factor *[hassle_inv]*	Investing in the stock market is complicated and I have to spend a lot of time and effort into it.	1=do not agree at all, 7=agree completely
Hassle factor sustainable *[hassle_sust]*	Investing in sustainable ESG products is complicated and I have to spend a lot of time and effort into it.	1=do not agree at all, 7=agree completely
Attention check 3 *[attention_check_3]*	Please select "strongly disagree" here. This is a test question.	
	Investments	
Current assets *[assets_overall_current]*	Please indicate in which of the following forms of investment you currently have your money invested. *Please select all applicable answers.* 1. Savings book 2. Current account or savings account 3. Building society contract 4. Cash 5. Savings plan 6. Funds (e.g., funds with stocks and/or bonds, including ETFs or index funds) 7. Individual shares 8. Bonds 9. Cryptocurrencies 10. Retirement provision, such as life insurance or pension insurance 11. Other investments, e.g. gold, property 12. None of the listed forms of investment	Gutsche 2020; Similar to OECD 2022 QF3 [MC, recode as 1 = yes, 0 = no]
Percent sustainable investments *[assets_sust_perc]*	What is the current percentage of <u>sustainable</u> stock, bonds, and funds (i.e., financial products that take into account environmental, social, or governance factors) in your total amount stocks, bonds and funds? 0. 0% - I do not own sustainable assets. 1. 1 to 24% 2. 25 to 50% 3. 51 to 75% 4. 76 to 99% 5. 100% - I only own sustainable assets. 6. I don't know	Gutsche 2020, similar in Brunen 2022
Sustainable investments *[assets_sustainable]* *[only if previous questions is*	Please indicate in which of the following <u>sustainable</u> forms of investment you currently have your money invested. *Please select all applicable answers*. 1. Sustainable savings book 2. Sustainable current account or savings account 3. Sustainable savings plan 4. Sustainable funds (e.g., funds with sustainable shares and sustainable bonds, incl. sustainable ETFs or index funds)	

answered with more than 0%]	5. Sustainable shares 6. Sustainable bonds 7. Sustainable retirement provision, such as life insurance or pension insurance 8. None of the listed forms of investment	
Experience *[experience]*	For how many years have you had experience as an investor with stocks, funds, bonds, etc.? 0. I do not have any experience. 1. Less than one year 2. 1 to 2 years 3. 3 to 4 years 4. 5 to 6 years 5. 7 to 8 years 6. 9 to 10 years 7. More than 11 years	
	Environmental attitudes and behavior	
	Please indicate to what extent you agree with the following statements.	
Sustainable lifestyle *[sust_lifestyle]*	I lead a predominantly sustainable lifestyle in my everyday life	Derived based on Stern 1999; van der Werff 2013.; 1=do not agree at all, 7=agree completely
Climate awareness *[climate_awareness]*	Climate change is a serious problem that needs to be solved.	Heeb et al. (2021) 1=do not agree at all, 7=agree completely
	Sociodemographic variables	
	Finally, we would like to ask you to answer a few questions about yourself:	
Education *[education]*	Please indicate your highest level of education completed: 1. Primary/secondary degree 2. Vocational training 3. BMS – College for intermediate vocational eduation 4. BHS – College for higher vocational education (A-levels) 5. AHS – Academic secondary school (A-levels) 6. University (or university of applied sciences) 7. Doctorate, habilitation 8. Other 9. Prefer not to answer	
Economic education	How high was the proportion of your education that was dedicated to economics and finance compared to the population in Austria?	Van Rooij 2011;

[education_economics]		(1 = very low, 5 = very high)
Professional experience *[prof_experience]*	Are you, or have you ever been professionally involved with investments? 1. Yes 2. No	
Household income *[hh_income]*	Please provide the monthly net household income of all persons currently living permanently in your household: (Household income is the sum of the income of all persons living together in a household and can be made up of various sources of income. Please refer to the current net monthly amount, e.g., after deduction of taxes and social security contributions, and add regular payments such as pensions, unemployment benefits, housing allowances, child support, alimony, etc. If you are not sure, please estimate the monthly amount). 1. below 1.000 euros 2. 1,001 euros bis 2,000 euros 3. 2,001 euros bis 3,000 euros 4. 3,001 euros bis 4,000 euros 5. 4,001 euros bis 5,000 euros 6. 5,001 euros bis 6,000 euros 7. 6,001 euros bis 7,000 euros 8. 7,001 euros bis 8,000 euros 9. 8,001 euros or more 10. Prefer not to answer	Gutsche (2020)
	End of Survey	
Comment	Anything else you would like to share with us in closing? [open answer format, text]	
Thanks	Thank you very much for your participation! Your contribution helps us a lot. The questionnaire is now closed, you can now close this window. [contact of authors]	

Appendix D. Questionnaire Study 2 (translated from German)

Table D.1.

PAGE	TEXT (Particpants' View)	Scale
Welcome	Dear Sir or Madam, in this questionnaire, we, [name of the institute], are interested in the topic of financial investments. The participation takes about 10 minutes.	

	As part of the study, you have the opportunity to allocate 500 euros to various investment products. Among all participants, 5 will be randomly selected and their investment decision will be financed and realized out by us. These 5 persons will be paid the value of the investment after one year. The winners will be informed in about two weeks by email. By conscientiously and completely filling out the questionnaire, you are making a significant contribution to our scientific research! Thank you very much for your support. [names and contact of authors]	
	Data protection	
Data protection	Your rights and information on data protection - The security of your data is important to us! By confirming the stated conditions at the bottom of this page, you can proceed to the questionnaire. [data protection agreement] I hereby confirm that I agree and consent to the above conditions.	
	Filter for quota	
	Before you begin, three quick questions about yourself.	
Gender *[gender]*	Which gender do you feel you belong to? 1. Male 2. Female 3. Non-binary, transgender, other	
Age *[age]*	Please indicate your age in years: [open answer format from 14 to 100 years]	*[below 18y will be excluded]*
Education *[education]*	Please indicate your highest level of education completed: 1. Primary/secondary degree 2. Vocational training 3. BMS – College for intermediate vocational education 4. BHS – College for higher vocational education (A-levels) 5. AHS – Academic secondary school (A-levels) 6. University (or university of applied sciences) 7. Doctorate, habilitation 8. Other 9. Prefer not to answer	
	Investment Decision	
Investment decision *[investment_decision]*	Please imagine the following situation. You are at an investment consultation at your bank because you want to invest 500 euros for one year. Your bank advisor presents you with four funds and one savings account, to which you can allocate your money.	Instructions adapted from Gutsche 2023 and Seifert 2024

	The descriptions shown are based on real investment products. [*funds shown in random order*]	

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 fond volume in %)	Galp Energia (6,5%) USD Cash (4,38%) Ovinitiv 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%) Respol (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 Environment (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%)	-

Please distribute 500 euros among these five investment options. You can invest the entire 500 euros in one investment option (4 funds, 1 savings account) or divide the amount evenly or unevenly between all options. To do so, please enter the desired amount in the corresponding fields.

Remember that five participants will be randomly selected, where this decision will be realized and paid out after one year according to the performance.

So, imagine that this is your own money, which you want to have back in a year by selling your funds or withdrawing your money from your savings account.

	Fund A	Fund B	Fund C	Fund D	Savings account
Amount	X €	X €	X €	X €	X €

Questions on Investment Decision

Please answer this question with regards to the investment decision you have just made.

Reason for Sustainable Assets	What [is/would] be the most important reason for you to invest <u>sustainably</u> (i.e., ecologically, socially, ethically)?	Degryse 2023

[reason_pro_SI_assets]	1. mainly a financial reason (For example, the expectation that sustainable investments yield a higher return (profit) than non-sustainable investments). 2. mainly a non-financial reason (For example, the expectation that sustainable investments have a positive impact on the environment or society).	
	Sustainable Finance Literacy [randomized question order]	
Sustainable Finance Literacy	Next, we are interested in your knowledge on sustainable finance, e.g., financial products that consider ESG-criteria (environmental, social and governance). Please indicate whether these statements are false or true.	0 = false, 1 = correct, 9 = I don't know;
Greenwashing meaning *[i3_SFL_greenwashing_meaning]*	Greenwashing means that a financial product is, for example, advertised as environmentally friendly even though environmental aspects are hardly or not considered in the investment strategy.	True
Labels *[i4_SFL_labels]*	Quality labels such as the Austrian Eco-Label (UZ49) aim to ensure that an investment product meets defined sustainability criteria.	True
EU Taxonomy *[i5_SFL_taxonomy_meaning]*	The EU Taxonomy is a classification system that defines which economic activities are considered environmentally sustainable (= green).	True
Exclusion criteria *[i12_SFL_exclusion_criteria]*	Exclusion criteria can be used to exclude countries, sectors or companies that do not meet certain ESG criteria from personal investments.	True
Products *[i16_SFL_products]*	Sustainable investment products can include individual stocks, bonds, investment funds, or index funds and ETFs (Exchange Traded Funds).	True
Fees *[i19_SFL_fees_recoded]*	The fees for sustainable investment products are always significantly higher than those for conventional investment products.	False
Performance *[i26_SFL_performance_recoded]*	Returns are significantly lower for sustainable ESG financial products than for conventional financial products.	False
Attention check *[attention_check]*	Please select *„false*" here. This is a test question.	Displayed randomly within the SFL questions; 0 = false, 1 = correct, 9 = I don't know;

Confidence SFL *[confidence_SFL]*	How confident did you feel overall when answering the questions on sustainable finance?	1 = not at all confident, 7 = very confident
Q18-20	Advanced FL / Stock market literacy [randomized question order]	[three highest loading factors of advanced lit in van Rooij 2011]
Advanced Fin. Literacy *[FL_advanced]*	Next, we are interested in your knowledge of the stock market.	
Stock market *[FL_a_stock_market]*	Which of the following statements describes the main function of the stock market? 1. The stock market helps to predict stock earnings 2. The stock market results in an increase in the price of stocks 3. <u>The stock market brings people who want to buy stocks together with those who want to sell stocks</u> 4. I don't know	Van Rooij adv. Q6; also used in Balloch 2015 Q1;
Mutual funds *[FL_a_mutual_funds]*	Which of the following statements is correct? 1. Once one invests in a mutual fund, one cannot withdraw the money in the first year 2. <u>Mutual funds can invest in several assets, for example invest in both stocks and bonds</u> 3. Mutual funds pay a guaranteed rate of return which depends on their past performance 4. None of the above 5. I don't know	Van Rooij adv. Q8; also used in Balloch 2015 Q9;
Value volatility *[FL_a_volatility]*	Normally, which asset displays the highest fluctuations over time? 1. Savings accounts 2. Bonds 3. <u>Stocks</u> 4. I don't know	Van Rooij adv. Q11; Also used in Balloch 2015 Q4;
	Stock market / holder image	
Stockholder image *[stock_holder_image]*	Please indicate the extent to which you agree with the following statements. People who participate in the stock market and own financial assets such as stocks or funds, are on average ...	Henkel 2022 1 = completely disagree, 7 = completely agree
[SHI_greedy]	Rather greedy [Info: Greedy: a strong wish to continuously get more of things like wealth, possessions or social values.]	
[SHI_gambler]	Rather gamblers [Info: Gambler: a person that shows the tendency to risk money or other stakes in the hope of being successful.]	

[SHI_selfish]	Rather egoistic [Info: Selfish: being willing to accept negative consequences for other people or the environment to gain a personal advantage as a result.]	
	Please indicate the extent to which you agree with the following statements.	Dobni 2015, 2016, Combination of 3-4 highest loading items; Only relevant dimensions used 1 = completely disagree, 7 = completely agree
Immorality *[SMI_imm]*	The stock market is corrupt, under-regulated and harmful to society as a whole.	
Wealth creating capacity *[SMI_wcc]*	The benefits of investing in the stock market outweigh the costs and risks. [reversed]	
ESG image *[SMI_esg]*	The environment and social aspects are only secondary in the stock market.	Adapted from Jeong 2014 1 = completely disagree, 7 = completely agree
	Investment / greenwashing beliefs	
	Now we are interested in your opinion on sustainable investments, i.e., investments that consider ESG-criteria (environmental, social and governance).	
Subjective ability to identify green product *[subjective_ ability_SFL]*	Compared to the Austrian population, how well can you assess which financial investments are eco-friendly (green) and which are just pretending to be?	Similar to Degryse 2023; 1 = not at all good; 4 = mediocre, 7 = exceptionally good
	Please indicate the extent to which you agree with the following statement.	
Greenwashing beliefs *[greenwashing _belief]*	Sustainable investments are often related to greenwashing (a marketing ploy to make financial products appear more eco-friendly than they actually are).	Degryse 2023; 1 = completely disagree, 7 = completely agree
Check greenwashing *[check_gw]*	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.	Own; 1 = never, 5 = always
Hassle factor sustainable *[hassle_sust]*	Investing in sustainable investments (e.g. sustainable equity funds) is complicated and I have to spend a lot of time and effort on it.	Sivaramakrishnan 2016

	Preferences and traits	
	Next, we would like you to answer a few questions about your preferences:	
Altruistic values *[altruistic_values]*	Please indicate how important the following values are to you as guiding principles in your life.	DeGroot (2007, 2008), we used the two highest correlated items, similar as in Kleffel 2022 and Paetzold 2015 1 = completely against my principles; 7 = of utmost importance
[values_alt_justice]	Social justice: correcting injustice	
[values_alt_equality]	Equality: equal opportunities for all	
Biospheric values *[biospheric_values]*	Please indicate how important the following values are to you as guiding principles in your life.	
[values_bio_unity]	Unity with nature: living in harmony with nature	
[values_bio_protect]	Protecting the environment: preserving nature	
Risk taking *[risk_taking]*	How would you rate your risk tolerance with regard to financial matters?	Similar: Dohmen 2011, also in Gutsche 2023, Henkel 2022, Degryse 2023 1 = not at all willing to take risks, 7 = very willing to take risks
Patience *[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?	Gutsche 2023, Falk 2018 1 = not at all willing, 7 = very willing
General trust *[trust_general]*	Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?	Guiso 2008, Henkel 2022 1 = you can never be too careful, 7 = you can completely trust most people

Polictical spectrum *[pol_spect]*	In politics, a distinction is often made between "the left" and "the right". Where would you place yourself on the scale below, where 1 means left and 7 means right?	Henkel 2022, obtained from 2020 politics and values LISS panel
Q49-54	Investments	
	Finally, we are interested in your financial investments.	
Stock market investments *[stock_market_ investments]*	Have you invested assets in stocks, bonds or funds (e.g., funds or savings plans with stocks and/or bonds, incl. ETFs or index funds)? 0. No 1. Yes	
Percent investments [*assets_perc*] [only if stock_market_ investments is answered with 1 - yes]	What is the current percentage of stocks, bonds or funds (e.g., funds or savings plans with stocks and/or bonds, incl. ETFs or index funds) in the total amount of your assets? 1. [[[if stock_market_ investments == 0]]] 2. 1 to 24% 3. 25 to 50% 4. 51 to 75% 5. 76 to 99% 6. 100% - I only have investment products such as shares or funds	
Percent sustainable investments *[assets_sust_perc]* [only if stock_market_ investments is answered with 1 - yes]	What is the current percentage of <u>sustainable</u> stock, bonds and funds (i.e., financial products that take into account environmental, social, or governance factors) in your total amount stocks, bonds and funds? 0. 0% - I do not own sustainable assets 1. 1 to 24% 2. 25 to 50% 3. 51 to 75% 4. 76 to 99% 5. 100% - I only own sustainable assets	Gutsche 2023, similar in Brunen 2022
Experience *[experience]*	For how many years have you had experience as an investor with stocks, funds, bonds, etc.? 1. I do not have any experience 2. Less than one year 3. 1 to 2 years 4. 3 to 4 years 5. 5 to 6 years 6. 7 to 8 years 7. 9 to 10 years 8. More than 11 years	
Household income	Please provide the monthly net household income of all persons currently living permanently in your household:	Gutsche (2023)

[hh_income]	(Household income is the sum of the income of all persons living together in a household and can be made up of various sources of income. Please refer to the current net monthly amount, e.g., after deduction of taxes and social security contributions, and add regular payments such as pensions, unemployment benefits, housing allowances, child support, alimony, etc. If you are not sure, please estimate the monthly amount). 1. below 1.000 euros 2. 1,001 euros bis 2,000 euros 3. 2,001 euros bis 3,000 euros 4. 3,001 euros bis 4,000 euros 5. 4,001 euros bis 5,000 euros 6. 5,001 euros bis 6,000 euros 7. 6,001 euros bis 7,000 euros 8. 7,001 euros bis 8,000 euros 9. 8,001 euros or more 10. Prefer not to answer	
Learning style *[learning_style]*	How would you like to be educated about sustainable finance? 1. Watch videos 2. Read short texts 3. Self-test with questions and feedback on answers 4. Not at all 5. [open answer]	
	Follow-up questions regarding properties of the investment products	
	We now show you once again the investment products that were available when you made your investment decision. *[show funds again]*	
Follow-up question rating *[manip_check_ rating]*	With regards to environmental issues, how sustainable do you consider the funds and the savings account to be? Funds A, B, C, D, savings account	1 = not at all sustainable, 7 = completely sustainable
Follow-up question greenwashing *[manip_check_ gw]*	Which of the products is most likely greenwashing, i.e., that the promises in the short descriptive text regarding environmental protection do not correspond to the truth or are glossed over 0. None 1. Fund A 2. Fund B 3. Fund C 4. Fund D	
	Debriefing	

Debriefing	None of the funds was officially convicted for greenwashing. However, there were allegations against Fund [A/B/C/D] by the Baden-Württemberg consumer center (LINK). As a result, the fund's advertising was adjusted and non-transparent promises were removed, e.g., that the investors of the fund invest "specifically in the achievement of climate targets" and thus "help to counteract climate change through targeted investment".
Revised investment decision *[investment_decision_revised]*	You now have the opportunity to adjust your investment decision based on this information. This decision will be used for realization of the investment if you are among the 5 randomly drawn winners. This means that for a possible payout of the value of the investment in one year, the investment decision made now is used and not the one at the beginning of the questionnaire. [[[show investment decision again with selected values of first investment decision]]]
	End of Survey
E-Mail-Address *[email_address]*	Among all participants, 5 will be randomly selected whose second investment decision will actually be implemented and paid out. If you would like to participate in this prize draw, please enter your email address now: [open with check for correct input]
Comment	Anything else you would like to share with us in closing? [open answer format, text]
Link to info material	If you are further interested in sustainable finance knowledge and would like to learn more about it, we recommend our interactive quiz (Link to website) and the information document linked there.
Thanks	Thank you very much for your participation! Your contribution helps us a lot. The questionnaire is now closed, you can now close this window. [Contact of authors]