International Journal of Accounting, Finance and Risk Management
2026, Vol. 11, No. 4, pp. 148–158
https://doi.org/10.11648/j.ijafrm.20261104.11

SciencePG
Science Publishing Group

Research Article

# Investor Psychology, Financial Literacy, and Cross-Cultural Bias Profiles in the Era of Digital Finance: A Four-decade Agenda with India as a Key Case

**Prateek Sheth Dawesar*** , **Anuradha Sharma**

School of Psychology, Shoolini University, Solan, India

## Abstract

This conceptual, narrative review synthesises literature on behavioural finance and investor psychology published from 1974 to June 2026, with particular attention to financial literacy, sustainability-oriented investing, digital trading environments, and the Indian retail-investor context. Searches of Scopus, Web of Science Core Collection, Google Scholar, and institutional publications from the Securities and Exchange Board of India (SEBI), Reserve Bank of India (RBI), National Centre for Financial Education (NCFE), and International Organization of Securities Commissions (IOSCO) were conducted using combinations of terms relating to investor bias, financial literacy, ESG investing, digital engagement practices, social trading, India, and measurement invariance. The review was designed as an agenda-setting conceptual synthesis rather than a systematic review or a primary bibliometric study; therefore, it does not estimate pooled effects or claim exhaustive coverage. The synthesis identifies four linked gaps: the predominance of isolated-bias studies; limited cross-cultural measurement invariance testing; insufficient evidence on whether financial literacy buffers or reshapes bias expression; and underdeveloped research on platform design, digital engagement practices, and investor protection. India is treated as an illustrative emerging-market setting, supported by evidence of substantial recent individual participation and losses in equity derivatives rather than as a basis for generalising to all investors. The article advances testable propositions that connect multidimensional bias profiles, financial literacy, digital platform features, cultural–institutional context, investment behaviour, and sustainability preferences. It concludes with a research agenda centred on validated instruments, multi-group CFA, longitudinal and transaction-linked designs, and ethically governed platform-embedded interventions.

## Keywords

Behavioural Finance, Investor Psychology, Financial Literacy, Digital Engagement Practices, India, Retail Investors, Digital Trading

## 1. Introduction

Over the last four decades or so, roughly 1984 to 2024, behavioural finance has become a distinct intellectual project as scholars have attempted to bridge the persistent gap between the predictions of normative, rational-agent models of financial decision-making and the observed behaviour of actual investors, traders, and managers. Contrary to the assumptions of

*Correspondence: Prateek Sheth Dawesar (Prateekshethdawesar@gmail.com)

**Received:** 22 August 2026; **Accepted:** 22 September 2026; **Published:** 31 October 2026

Copyright: © The Author(s), 2026. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

traditional finance theory, which postulated utility-maximizing agents with the capacity to process information efficiently and update their beliefs in accordance with Bayesian principles, behavioural finance observed systematic deviations from these assumptions, deviations that derive from the cognitive and emotional architecture of human judgement under uncertainty [2, 4]. Investor psychology, as a subset of this larger endeavour, is concerned with the beliefs, emotions, heuristics, and biases that determine how people perceive risk, develop expectations, and translate those expectations into trading and investment decisions.

During the first two decades of this period, the intellectual foundations of the field were laid down and consolidated: prospect theory, mental accounting, the heuristics-and-biases program, overconfidence, and loss aversion [5, 11, 12]. These foundations have since diffused into related domains such as behavioural corporate finance, asset pricing anomalies, and household finance. During the more recent third and fourth decades, three additional themes have emerged and now interact in complex ways with these classic constructs. The first is financial literacy, defined as the ability to understand and use financial concepts in real-life decisions; the second is sustainability-oriented finance, most visible in environmental, social, and governance (ESG) considerations in investment choices; and the third is the proliferation of digital trading platforms, mobile applications, and algorithmic recommendation systems that currently mediate a large and growing share of retail investment activity globally [7, 8, 25].

These newer themes should not be treated as independent of classic biases. Financial literacy may be associated with better planning and selected financial outcomes, yet knowledge alone does not necessarily remove motivational or self-attribution processes underlying overconfidence [7, 17]. Similarly, sustainable-investment choices reflect social preferences, values, beliefs, and expected financial consequences; these motives may coexist with social influence and uncertainty-related decision processes [8, 18, 19]. Digital trading environments may alter the salience, immediacy, and frequency of investment decisions through interface design, notifications, feedback, and social features. However, the direction and magnitude of these effects are empirical questions that require platform-specific evidence rather than assumption [20].

The main purpose of this review is to map the intellectual clusters that constitute contemporary behavioural finance and investor psychology research and then to delineate substantive gaps that merit further academic attention. The following analysis is structured around four such gaps: cross-cultural bias comparisons; interactions between financial literacy and bias profiles; links between sustainability preferences and classic biases; and methodological frontiers including psychometrics, longitudinal designs, neurofinance and algorithmic behavioural finance. India and other emerging markets are featured throughout as key illustrative cases due to their rapid digitalisation of retail investing, growing but uneven financial literacy, and dense social information networks that differ meaningfully from the developed-market settings in which the founding empirical literature was largely developed [25].

## 2. Methodological Stance of the Review

### 2.1. Review Design and Purpose

The present article is a conceptual narrative review and agenda-setting synthesis. Its purpose is to integrate influential and recent literature relevant to investor psychology, financial literacy, sustainability-oriented investment, digital trading environments, and cross-cultural measurement, and then to identify theoretically connected research gaps. It is not presented as a systematic review, meta-analysis, or primary bibliometric study. Accordingly, the article does not claim exhaustive retrieval, does not calculate pooled effect sizes, and does not generate original co-citation, bibliographic-coupling, or keyword-network statistics. This explicit positioning is important because each review tradition has distinct evidentiary requirements and permissible forms of inference [13, 14].

### 2.2. Search and Source-Selection Procedure

To improve transparency and reduce selective coverage, literature was identified through structured searches conducted from May to June 2026 in Scopus, Web of Science Core Collection, and Google Scholar. The search covered publications from 1974 to June 2026 and used combinations of the following terms: behavioural finance OR behavioral finance; investor psychology; overconfidence; loss aversion; herding; financial literacy; ESG OR sustainable investing; digital trading OR trading app OR gamification OR digital engagement practices OR social trading; India OR Indian retail investor; and measurement invariance OR cross-cultural validation OR psychometrics.

The review also examined institutional and regulatory publications that directly describe the Indian market and digital-investor-protection environment, including reports and releases from SEBI, RBI, NCFE, and IOSCO. These sources were used only for factual context concerning regulation, participation, financial education, or investor outcomes; they were not treated as substitutes for peer-reviewed causal evidence.

Sources were retained when they met at least one of four criteria: (a) foundational theoretical or empirical relevance to investor decision-making; (b) direct relevance to financial literacy, ESG preferences, digital engagement, or social influence; (c) methodological relevance to cross-cultural adaptation, CFA, IRT, latent profile analysis, SEM, or measurement invariance; or (d) authoritative institutional relevance to the Indian retail-investor setting. Studies focused solely on firm-level behavioural corporate finance, purely technical algorithmic trading, or non-investment consumer choice were excluded unless they directly informed the proposed constructs or methods. The final synthesis prioritised peer-reviewed reviews, influential empirical studies, methodological guidance, and current primary institutional sources.

### 2.3. Analytical Approach and Boundary Conditions

The retained literature was organised into five connected domains: foundational behavioural-finance mechanisms; financial literacy; sustainability-oriented investment; digital platform and social-information environments; and psychometric and cross-cultural measurement. Research gaps were identified where these domains were examined separately, where constructs were measured with non-equivalent instruments, where self-reported outcomes dominated over behavioural records, or where causal language exceeded the underlying study designs.

This procedure improves traceability but does not eliminate the limitations of a narrative synthesis. Findings should therefore be interpreted as a theoretically grounded research agenda rather than as a definitive estimate of prevalence, effect magnitude, or cross-national differences. In particular, claims about India are limited to evidence cited from Indian institutional sources and should not be extrapolated to all emerging markets without comparable data.

### 2.4. Distinguishing Review Traditions

A narrative review provides conceptual interpretation and integration but is vulnerable to selective citation if its scope and source-selection principles are not declared. A systematic review uses an explicit, reproducible protocol with predefined eligibility criteria and a transparent selection process. Bibliometric and scientometric reviews quantitatively map publication metadata, citations, co-citations, or keyword co-occurrence. These approaches are complementary rather than interchangeable; the present study adopts the first approach while drawing cautiously on published reviews and mappings where relevant [13, 14].

***Table 1.*** *Scope, evidence base and interpretive limits of the review.*

| Domain | Main evidence used | What this review can conclude | What it cannot conclude |
|---|---|---|---|
| Foundational behavioural finance | Seminal theory and account-level empirical studies | Classic biases provide plausible mechanisms for investor behaviour | That a specific bias explains every observed retail outcome |
| Financial literacy | Peer-reviewed reviews and Indian institutional reports | Literacy is relevant to planning, capability and investor protection | That literacy automatically removes bias or causes better outcomes in every setting |
| ESG investing | Empirical studies and recent reviews | Values, preferences, beliefs and financial motives can jointly shape ESG choices | That ESG adoption is inherently irrational or merely herding |
| Digital engagement practices | IOSCO policy research and related literature | Platform design warrants study and proportionate investor-protection attention | That any particular feature causes losses without platform-specific causal evidence |
| India | SEBI, RBI and NCFE sources | India is a relevant empirical context with documented retail-derivatives risks and evolving financial-education infrastructure | That all Indian investors, or all emerging markets, have the same bias profile or outcomes |
| Cross-cultural measurement | Methodological literature | Measurement invariance is necessary before mean comparisons across groups | That observed score differences are substantive without invariance evidence |

*Table note:* The review is a conceptual narrative synthesis. It is not a systematic review, meta-analysis or original bibliometric study.

## 3. The Intellectual Map of Behavioral Finance: Four Decades

### 3.1. Foundational Period: Prospect Theory, Heuristics, and Biases

The first period of behavioural finance, from early-to-mid 1980s to the late 1990s, was characterised by the importation of cognitive and judgment-and-decision-making psychology into the analysis of financial choice. Prospect theory, with its characterisation of reference-dependent evaluation, loss aversion, and the asymmetric weighting of gains and losses, provided the field's foundational descriptive model of choice under risk, displacing expected-utility theory as the default account of how investors actually evaluate uncertain prospects [5]. The original paper, published in Econometrica and widely

regarded as one of the most important papers in economics of the late twentieth century, developed the framework of losses appearing larger than equivalent gains - a principle that has direct implications for portfolio behaviour, risk management and retail investment decisions [19].

The heuristics-and-biases program and prospect theory documented a family of systematic judgement errors - availability, representativeness, anchoring, and related heuristics - that investors and forecasters seemed to rely on when judging probabilities and forming expectations under uncertainty [12]. The next stage was mental accounting which built on this basic work by describing how people divide wealth and income into separate mental categories which are not fungible and thus decisions deviate from the fungibility assumption of standard portfolio theory [11]. Overconfidence and loss aversion emerged as the two most widely examined individual-level constructs in the field, offering parsimonious explanations for stylised empirical regularities such as excessive trading volume, the disposition effect and under-diversification [9].

## 3.2. Expansion Period: From Individual Bias to Market and Corporate Behavior

In a second phase, roughly the 2000s, these individual-level constructs were extended in two directions. The first extension shifted the focus from the psychology of individual investors to market-level anomalies, asking how aggregate investor sentiment, limits to arbitrage, and behavioural frictions could sustain mispricing patterns that classical efficient-market reasoning had difficulty accommodating [2]. Hirshleifer's seminal survey in the Journal of Finance formalised the connection between psychological biases (representativeness, conservatism, self-attribution bias, and overconfidence) and asset pricing [4]. The second extension directed the behavioural lens inward, toward the firm, leading to behavioural corporate finance. During this period a separate and growing cluster emerged dealing with the herding and social influence [3]. This cluster is concerned with how the decision of investors is influenced not only by private information and individual cognitive prejudices, but also by observation and inference of the behaviour of other market participants. The most persuasive empirical evidence connecting overconfidence with overtrading, established that individual investor biases have direct and quantifiable consequences for inferior financial results [1].

## 3.3. Recent Period: Financial Literacy, Sustainability, and Digital Finance

The third and fourth decades, from the 2010s to the mid-2020s, have seen the emergence of two thematic clusters that were largely absent from the foundational literature. Research on financial literacy and financial education has grown considerably, spurred by policy interest in retail investor protection and the design of disclosure and advisory regimes [7]. In the Journal of Economic Literature, Lusardi and Mitchell provided a thorough review of a growing body of evidence that financial literacy is positively related to wealth accumulation, retirement planning, and better portfolio choices in a variety of national settings. The second big recent cluster is sustainability-oriented finance and ESG-related investor behaviour. In the Journal of Finance, Riedl and Smeets [8, 19] find that social preferences and social signaling explain socially responsible investment decisions in ways beyond purely financial motives, and directly link sustainability behaviour to the wider psychological universe of investor decision making. The third significant recent development is the rise of digital trading platforms and social-trading features that have altered the medium through which classic biases are manifested and the strength with which they operate.

## 3.4. Literature Growth, Convergence and Fragmentation

Published reviews show that behavioural finance has expanded from its early focus on judgement under risk into a broader literature spanning individual decision-making, household finance, market sentiment, financial literacy, sustainable investing, and digitally mediated participation [2, 18]. The present article does not conduct an original bibliometric analysis and therefore does not report new claims about publication-growth rates, thematic-cluster sizes, or the relative growth of specific topics. Instead, it uses the visible diversification of the literature as the starting point for a conceptual question: whether these domains have been sufficiently integrated at the level of the individual investor.

A recurrent limitation is that empirical studies often examine one bias, one outcome, or one setting at a time. This design has generated valuable evidence, but it provides limited insight into the co-occurrence of biases, the role of financial literacy in their behavioural expression, or the conditions under which digital environments and cultural–institutional contexts shape observed actions. The remainder of this review therefore treats multidimensional bias profiles as a research proposition to be tested, rather than as an established empirical taxonomy.

## 3.5. The Central Limitation: Fragmentation Along Single-bias Lines

The central limitation motivating this review is that these clusters are typically studied in relative isolation from one another. A study of overconfidence rarely incorporates a validated financial literacy measure; a study of ESG preference rarely incorporates a validated battery of classic bias constructs. The result is a literature that is broad in thematic coverage but shallow in integration: investor psychology is documented bias-by-bias and theme-by-theme, rather than as a coherent, multidimensional psychological profile. As Statman

[10] argued in Finance for Normal People, the behavioral finance project has matured to the point where it must move beyond cataloguing individual errors toward building integrated frameworks that capture the fuller range of normal investor wants, cognition, and emotions. The sections that follow take this challenge seriously, beginning with the architecture of biases themselves.

# 4. Investor Bias Architecture and Psychometric Gaps

## 4.1. The Limits of the Single-bias Approach

The dominant empirical approach in investor psychology research is what one might term the single-bias approach: a study constructs or adopts a measure of a single construct—overconfidence, loss aversion, herding tendency, or some other discrete bias—and examines its relationship with an outcome of interest, such as trading frequency, portfolio risk, or investment returns [1, 9]. This strategy has generated a large and informative body of findings, but has two related limitations. First, as each study typically measures only one or two constructs, it is not possible to assess how multiple biases co-occur, interact, or substitute for each other within the same individual. Second, single-bias studies often use short, ad hoc questionnaires designed for a single study and have limited formal psychometric validation - limited evidence of the reliability, dimensionality, and construct validity of the instrument used.

Another conceptual consequence is that the single bias approach treats each bias implicitly as an independent predictor variable, as if it were a demographic control, rather than one dimension of a broader, more structured psychological space. It is hard to ask whether an overconfident investor is more or less likely to be loss averse as well, or whether some biases tend to come in clusters that recur across individuals in recognisable patterns, under this framing. Hirshleifer raised this question in his survey of investor psychology and asset pricing, but the empirical literature has not yet addressed it systematically [4].

## 4.2. From Isolated Biases to Testable Multidimensional Profiles

A multidimensional framing is theoretically useful but should not be treated as established measurement fact. Overconfidence, loss aversion, disposition tendencies, social comparison, and herding may be correlated, distinct, or partly explained by higher-order dimensions depending on the population, task, language, and measurement method. The proposed labels—cognitive optimism, loss-averse conservatism, and social-herding tendency—are therefore organising hypotheses for scale development and model testing, not validated constructs in their own right.

Future studies should begin with qualitative item generation and expert review, evaluate content validity, test alternative first-order and higher-order factor structures through CFA, and assess reliability and convergent, discriminant, and criterion validity. Where theory and sample size permit, IRT can evaluate item functioning across levels of each latent trait, while latent profile analysis can test whether recurring combinations of trait scores identify substantively meaningful groups. Any resulting profile solution should be replicated in independent samples before being interpreted as an investor typology [15, 16].

## 4.3. Psychometric Requirements for Profile-based Research

Profile-based research requires substantially stronger measurement practice than ad hoc composite scoring. First, instruments should document content validity, internal consistency or model-based reliability, factor structure, and construct validity. Second, cross-cultural research requires a documented translation and cultural-adaptation process rather than literal translation alone. Third, researchers should test measurement invariance before comparing latent means or observed scores across language, region, gender, age, investor-experience, or national groups.

A minimum multi-group CFA sequence should test: (a) configural invariance, indicating a comparable factor pattern; (b) metric invariance, indicating comparable factor loadings and permitting comparison of associations; and (c) scalar invariance, indicating comparable intercepts or thresholds and supporting latent-mean comparison. Residual invariance may be examined when justified. Researchers should report group-specific sample sizes, estimation method, missing-data treatment, model-fit indices, nested-model comparisons, and decisions regarding partial invariance. Without these steps, apparent group differences may reflect response styles, translation effects, or differential item functioning rather than substantive differences in investor psychology [15, 16].

## 4.4. Implications for Standardized, Cross-country Instrumentation

These psychometric deficiencies are not just technical limitations; they directly constrain the field's ability to address the cross-cultural and literacy-interaction questions that are the motivating force for this review. One of the major limitations, as pointed out by Lusardi and Mitchell [7] in their review of literature on financial literacy, is the lack of consistency in how financial knowledge is measured in different studies, which hampers the comparison of literacy-related results across countries or over time. The bias measurement suffers the same problem, if not worse. To facilitate meaningful cross-country comparisons of bias profiles, an instrument that has been validated for measurement invariance across the contexts of interest is needed. The creation of such standardised,

validated and cross-culturally applicable instruments is thus a necessary methodological precondition for much of the research agenda proposed later in this review.

# 5. Cross-cultural Bias Comparisons and Financial Literacy

## 5.1. Why Cross-cultural Comparison Matters

Cross-cultural comparison matters because investment behaviour is expressed within institutional, technological, and social environments. Regulatory protections, product access, leverage availability, investor education, market participation patterns, and norms concerning social information may condition the relationship between psychological dispositions and observable investment decisions. Such contextual effects should be empirically tested rather than inferred from national labels alone [2, 4, 15].

India is an important illustrative setting because its retail-investor environment has changed rapidly and because official evidence documents substantial individual participation and losses in the equity F&O segment. SEBI reported that 93% of individual traders in equity F&O incurred losses during FY2022–FY2024, with aggregate losses exceeding ₹1.8 lakh crore; these figures describe outcomes in that specific segment and period and should not be interpreted as evidence that all Indian investors trade irrationally or lose money [21]. India also has a developing financial-education and inclusion infrastructure: the RBI reported an FI-Index value of 60.1 in March 2023, while national financial-literacy programmes assess knowledge, behaviour, and attitudes across diverse demographic groups [22-24]. These features make India a valuable setting for carefully designed studies of investor capability, digital access, and behavioural risk [24].

## 5.2. Limits of Existing Cross-cultural Evidence

Cross-cultural comparison is only meaningful when measures operate comparably across groups. Studies that use different questionnaires, translations, sampling frames, and market periods cannot establish that observed mean differences represent genuine differences in the construct. The practical implication is not that cross-cultural research should be avoided, but that it should be sequenced: cultural adaptation and qualitative pretesting should precede CFA; CFA should precede multi-group invariance testing; and invariance evidence should precede substantive comparisons of latent means or profiles [15, 16].

Convenience samples may be useful for instrument development and early theory testing, but they should not be presented as representative of national investor populations. Studies should describe eligibility criteria, investor experience, product exposure, recruitment channel, language, and the likely limits of generalisability. For cross-country studies, matched sampling plans and harmonised field procedures are particularly important.

## 5.3. Financial Literacy as Buffer or Reshaping Moderator

Financial literacy is best treated as a multidimensional capability encompassing knowledge, attitudes, behaviours, and the capacity to apply financial concepts in decisions [7, 22, 23]. Existing evidence links literacy with planning and selected financial outcomes, but this association does not establish that literacy uniformly eliminates cognitive or emotional biases [7, 13, 17]. A more precise framework distinguishes two testable possibilities.

First, the buffer proposition predicts that higher financial literacy weakens the association between maladaptive bias tendencies and risky or costly investment behaviour. Second, the reshaping proposition predicts that literacy changes the form through which a bias is expressed—for example, by altering product choice, information search, or trading strategy—without necessarily reducing the underlying disposition. These propositions are competing empirical possibilities. They should be tested using validated measures of literacy and bias, objectively measured outcomes where possible, and interaction models that report simple slopes and uncertainty estimates.

## 5.4. Sustainability Preferences and Classic Biases

The conceptual framework treats multidimensional bias tendencies as potential antecedents of investment behaviour and sustainability-related choices. Financial literacy is proposed as a moderator, while cultural–institutional context and digital-platform features are treated as boundary conditions. The framework is intentionally testable and does not assume that all pathways will be positive, uniform, or invariant across settings.

*Proposition 1.* Higher levels of cognitive optimism, loss-averse conservatism, and social-herding tendency will be associated with distinct patterns of investment behaviour, including turnover, risk-taking, diversification, disposition-related selling, and reliance on social information, after relevant demographic and investment-experience controls are included.

*Proposition 2.* Financial literacy will moderate the relationship between bias tendencies and investment behaviour. The direction of moderation should be evaluated empirically as either a buffering effect or a reshaping effect rather than assumed a priori.

*Proposition 3.* Sustainability-oriented investment preferences will be jointly associated with pro-social values, financial return expectations, ESG knowledge, perceived risk, and social-herding tendency. The incremental contribution of each construct should be estimated in the same model.

*Proposition 4.* The measurement and structural relations in

Propositions 1–3 may vary across linguistic, cultural, regulatory, and platform contexts. Cross-group comparisons should be made only after appropriate measurement-invariance testing.

*Proposition 5.* Digital engagement practices, including notifications, feedback, gamified elements, and social or copying features, may moderate the relationship between investor characteristics and trading outcomes. Claims of platform effects should be based on pre-registered field experiments, natural experiments, or longitudinal behavioural data when feasible [20].

## 5.5. A Conceptual Framework and Propositions

The preceding discussion can be organized into a single conceptual framework. At the center lies the investor's multidimensional bias profile — the latent combination of cognitive-optimism, loss-averse-conservatism, and social-herding tendencies (drawing on [1, 3, 9]. This bias profile is hypothesized to jointly determine, together with the investor's level of financial literacy [7], both the investor's general investment behavior and the investor's sustainability-related investment choices with financial literacy operating as a moderator that shapes how the bias profile is expressed in each domain rather than as an independent additive predictor alone [8, 13]. We hypothesise that cultural and institutional context including national regulatory regimes, market microstructure, and prevailing social norms around risk and investment, moderate the relationships in this framework, such that the same underlying bias profile and literacy level could lead to systematically different behavioural outcomes in, for example, India relative to the United States or continental Europe.

## 5.6. Digital Behavioral Finance: India and Emerging Markets

Digital trading environments can change how often investors encounter market cues, how quickly they can act, and how visible feedback and social information become. IOSCO characterises digital engagement practices as including prompts, gamification techniques, social features, and other design elements that can influence retail-investor engagement; it also notes that such practices may encourage more frequent trading in circumstances where this is not appropriate [20]. This evidence supports regulatory and research attention, but it does not imply that every feature harms every user or that design alone causes investor losses.

The Indian equity F&O setting illustrates why transaction-linked research is needed. SEBI's FY2022–FY2024 study reported high losses among individual F&O traders, but these administrative outcomes cannot, by themselves, identify whether losses result from overconfidence, leverage, product complexity, market conditions, platform design, selection into trading, or their interaction [21]. Accordingly, the appropriate research question is how psychometrically measured investor characteristics, product knowledge, actual trading records, and specific platform features jointly predict behaviour.

A rigorous platform-embedded study would obtain informed consent, collect only data necessary for the study, separate research participation from personalised investment advice, include privacy and data-governance safeguards, and predefine harm-reduction triggers. Potential interventions could include neutral risk-comprehension checks, cooling-off prompts, or clearer leverage disclosures, with outcomes evaluated through randomised or quasi-experimental designs. Such work should be developed in collaboration with ethics committees, platforms, and relevant regulators.

### 5.6.1. The Underdeveloped State of Platform-Embedded Behavioral Finance

Despite the evident behavioral significance of these design features, platform-embedded behavioral finance — research and practice that directly integrates psychometric assessment and behavioral intervention into the trading platform itself — remains underdeveloped. Very few documented efforts have installed validated psychometric modules directly within trading applications to assess users' bias profiles or financial literacy at the point of platform use. This represents a substantial gap between the design power that platforms evidently hold over investor behavior and the research and regulatory infrastructure available to measure, and where appropriate intervene upon, the biases that platform design may be amplifying. The emotional dynamics that Loewenstein [6] identified as systematically predictable are precisely those that platform design exploits; yet the behavioral finance literature has not yet developed the in-situ measurement tools needed to study these dynamics in their natural context.

### 5.6.2. Why India and Comparable Emerging Markets Are a Distinctive Setting

India and structurally similar emerging markets present a distinctive and arguably disproportionately important setting for platform-embedded behavioral finance research, for several converging reasons. High smartphone penetration combined with low-cost, app-based brokerage access has produced a retail investor base that is overwhelmingly digital-first. This retail base is simultaneously exposed to strong social information signals through social media, messaging-application investment groups, and informal peer networks consistent with the social-influence channels and to meaningful educational gaps in formal financial literacy, mirroring the uneven distribution patterns documented by [3, 7]. The combination of high social influence exposure, uneven literacy, and the emotional intensity of real-money trading under the visceral-factor framework of Loewenstein [6] positions India and comparable markets as settings in which platform-embedded behavioral finance research is likely to yield disproportionately informative results relative to the developed-market settings in which most existing research has so far been concentrated.

# 6. Methodological Frontiers and Underused Approaches

## 6.1. Longitudinal and Transaction-linked Designs

Cross-sectional surveys are useful for initial association testing but cannot establish temporal ordering or causality. Longitudinal designs can assess whether bias measures are stable, whether financial-literacy interventions persist, and whether market experiences subsequently alter self-reported beliefs. Where consent and governance permit, survey measures should be linked to objectively recorded outcomes such as turnover, holding periods, diversification, realised gains and losses, leverage use, and risk concentration. Account-level evidence remains a methodological benchmark for demonstrating the value of behavioural records over self-report alone [1].

Researchers should pre-register primary outcomes, distinguish exploratory from confirmatory analyses, and avoid treating repeated observations as independent. When causal inference is intended, designs should specify the intervention, counterfactual, assignment mechanism, attrition handling, and plausible confounders.

## 6.2. Neurofinance and Psychophysiology

Neurofinance and psychophysiology can complement—not replace—validated self-report and behavioural measurement. Measures such as EEG, fMRI, heart-rate variability, and skin conductance may provide information about arousal and attentional processes during financial tasks. Their interpretation, however, requires task-specific theory, adequate statistical power, preregistered analytic plans, and caution against reverse inference from physiological signals to complex psychological states [6].

The most informative designs would combine well-validated bias and literacy measures with standardised trading simulations or consented behavioural records, while reporting device specifications, preprocessing choices, exclusion criteria, and multiple-comparison controls. Given the sensitivity of biometric data, research protocols must include explicit consent, secure storage, limited retention, and a clear prohibition on using physiological signals for exploitative personalisation.

## 6.3. Multi-Modal Data and High-frequency Trading Records

A related but distinct opportunity is to link psychometric assessment to detailed order-level or high-frequency trading records rather than relying on coarse, self-reported or survey-based behavioural outcome measures. This approach follows the methodological precedent linking records of broking accounts for more than 66,000 households to generate objective measures of trading behaviour and performance [1]. They found that objective trade-level data reveal patterns, including the strong performance penalty for high turnover, that self-report measures are unable to identify. In markets like India, where the volume of digitally recorded retail trading activity has increased significantly, extending this logic to include psychometric bias and literacy measures in conjunction with trade-level data, would enable researchers to build much more accurate behavioural indicators of the constructs such as the disposition effect, overtrading and herding-consistent trade clustering.

## 6.4. Behaviourally Informed Digital Investor Protection

A more precise research direction is behaviourally informed digital investor protection: the ethically governed use of validated risk indicators and interface design to support comprehension, reduce impulsive action, and improve risk disclosure. Any system that profiles investors must avoid deterministic labelling, discriminatory treatment, opaque recommendations, or manipulation designed to increase engagement. Platform interventions should be evaluated for both intended benefits and unintended consequences, including reduced autonomy, avoidance of useful risk-taking, and differential effects across literacy and demographic groups [20].

# 7. Research Agenda: India and Trader-focused Digital Platforms

This section sets out a structured, forward-looking research agenda organized around five programmatic strands. Each strand is framed with an explicit motivation, a conceptual model linking the relevant constructs, and a statement of potential practical and societal relevance for Indian and comparable emerging-market investors and regulators.

## 7.1. Strand One: Standardized Bias and Literacy Measurement in India and Cross-country Comparison

*Motivation:* The absence of validated, cross-culturally applicable bias and literacy instruments constitutes a foundational obstacle to every other strand of this agenda. Lusardi and Mitchell [7] demonstrated that even within the relatively well-studied domain of financial literacy, non-comparable instruments have significantly impeded cross-country generalization; the same problem afflicts bias measurement with greater severity. Without instruments validated for measurement invariance across national and linguistic contexts — including Indian regional languages and English — comparative statements about cross-cultural differences in investor psychology remain methodologically suspect.

*Proposed direction:* Development and formal psychometric

validation of multidimensional bias scales — covering cognitive-optimism (drawing on the overconfidence literature [1], loss-averse-conservatism [5, 9], and social-herding-tendency [3] explicitly designed for cross-cultural equivalence testing [5].

*Proposed direction:* Coordinated comparative studies administering these validated instruments, alongside standardized financial literacy assessments consistent with the approach advocated by Lusardi and Mitchell [7] to matched or representative samples in India, the United States, and one or more European markets.

### 7.2. Strand Two: Bias-literacy Interactions in Young and Retail Investors

Motivation. Section 5.3 identified the interaction between financial literacy and bias profile as a central and underexplored question. Lusardi and Mitchell's [7] evidence that literacy is associated with better financial outcomes raises the possibility of the buffer mechanism; evidence also found that overconfident investors trade more and perform worse raises the question of whether literacy dampens or reshapes that overconfidence [1]. These two findings have not been jointly examined in a single research design.

*Research question:* How does financial literacy moderate the relationship between overconfidence and portfolio turnover or risk-taking among young retail investors, and does this moderation differ between digitally native investors and those who entered markets through traditional brokerage channels?

*Research question:* How do financial literacy and multidimensional bias profiles jointly predict the adoption of sustainability-labeled or ESG-oriented investment products and to what extent does this joint prediction differ from the predictive contribution of literacy or bias profile considered separately? [8, 16].

### 7.3. Strand Three: Platform-embedded Assessment and Intervention

*Motivation.* Section 5b.2 identified platform-embedded behavioral finance as substantially underdeveloped relative to the evident behavioral significance of platform design. The emotional and visceral dynamics that Loewenstein [6] identified as systematically predictable are directly relevant to platform-design interventions targeting loss aversion and overconfidence — two of the most robustly documented biases in the literature [1, 2, 5].

*Proposed experiment:* Integration of short validated psychometric modules directly into onboarding or periodic check-in flows in trading applications to classify bias profiles in real-time at point of platform access rather than through separate offline survey administration.

*Proposed experiment:* Randomized variation of user-interface elements — including risk warnings, behavioral nudges, and default settings for order size and leverage — tailored to a user's classified bias profile, with measurement of resulting outcomes including trading discipline and risk-management behavior.

### 7.4. Strand Four: Cluster-based Interventions and Simulation

*Motivation:* Section 4.2 proposed that investors may form recognizable, qualitatively distinct bias-profile classes. If such classes exist empirically — analogous to the distinct investor types that Statman [10] described in his unified behavioral finance framework — then interventions tailored to those classes may be more effective than uniform approaches.

*Proposed direction:* Application of latent profile analysis or related cluster-analytic methods to large-scale, multidimensional bias and literacy data to test empirically whether discrete investor-type classes exist within Indian and comparable retail-investor populations.

*Proposed direction:* Construction of behavioral simulations in which empirically derived investor-profile classes are parameterized into simulated agent populations, testing how alternative trading-engine designs, platform features, or financial-education program designs would be expected to perform across the full heterogeneity of identified investor types.

### 7.5. Strand Five: Multi-modal and Neuro-behavioral Research

*Motivation.* Section 6.2 identified neurofinance and psychophysiology as methodological frontiers remaining largely confined to controlled laboratory settings. The visceral and emotional dynamics that Loewenstein [6] argued are systematically predictable are precisely those that physiological measurement can capture non-invasively, and that are likely to be most intensely expressed in the high-stakes, high-speed environment of intraday equity trading and derivative markets — both of which have seen substantial retail-participation growth in India [16].

*Proposed direction:* Research designs combining validated psychometric bias scales, financial literacy assessments, and non-invasive physiological or psychophysiological measurement (for example, heart-rate-variability monitoring) with linked, objectively recorded trade-level data to examine how physiological stress and arousal markers relate to bias-profile classification and subsequent trading behavior [1, 15, 16].

*Proposed direction:* Explicit emphasis on high-stress trading environments in India, where the prospect-theoretic dynamics of loss aversion and the herding dynamics of may be most intensely expressed and most consequential for retail investor outcomes and financial system stability [3, 5].

## 8. Conclusion

This review has synthesized four decades of behavioral fi-

nance and investor psychology scholarship to argue that, notwithstanding the field's considerable intellectual maturation — from the foundational contributions of Kahneman and Tversky [5], Tversky and Kahneman [12], and Thaler [11] through the landmark empirical studies Shefrin and Statman [9] and the more recent contributions of Lusardi and Mitchell [7] and Riedl and Smeets [8] — the field continues to suffer from two related limitations: a tendency to study biases one at a time rather than as components of integrated psychological profiles, and a corresponding underdevelopment of the methodological infrastructure needed to overcome that fragmentation [1, 4].

Three specific areas were identified as particularly promising yet underdeveloped extensions of the existing literature. Cross-cultural comparison of investor biases remains constrained by the scarcity of instruments validated for measurement invariance across national and linguistic contexts — directly analogous to the measurement inconsistency problem Lusardi and Mitchell [7] identified as the central obstacle to cross-country financial literacy research. The interaction between financial literacy and bias expression remains conceptually underspecified, with the relationship plausibly operating as a reshaping moderator rather than, or in addition to, a simple protective buffer — a distinction with material implications for financial-education policy that extends the agenda of Lusardi and Mitchell [7] into the psychometric domain. The intersection of sustainability and ESG preferences with classic biases such as loss aversion, ambiguity aversion, and herding remains similarly underexplored, despite plausible conceptual mechanisms linking the two domains directly [3, 5, 8].

India and structurally comparable emerging markets have been advanced as crucial testing grounds for the next generation of behavioral finance research. The combination of rapid digitalization of retail investing, expanding but uneven financial literacy consistent with global patterns documented by Lusardi and Mitchell, and dense social information networks consistent with the herding dynamics, positions these markets as settings where the core arguments of this review — for integrated bias profiles, cross-cultural measurement, literacy-bias interaction studies, and platform-embedded behavioral interventions — can be most productively advanced [3, 7].

The overall agenda suggested by this review can be put in three linked propositions. Investor psychology research should move from investigating isolated biases to coherent, multidimensional, and where appropriate cluster-based investor bias profiles, supported by the psychometric infrastructure needed to rigorously characterise such profiles. Statman [10] called for a unified behavioural finance, and from this perspective, the field of behavioural finance should more fully incorporate cross-cultural context, financial literacy, sustainability preference, and digital-platform design into a single analytical frame. Future work must embrace real methodological rigor—longitudinal and panel designs, neurofinance and psychophysiological methods drawing on the visceral-factor framework of Loewenstein [6], multi-modal linkage to high-frequency trading data of the kind pioneered by Barber and Odean, and algorithmic behavioural finance [1].

## Abbreviations

| | |
|---|---|
| CFA | Confirmatory Factor Analysis |
| DEPs | Digital Engagement Practices |
| EEG | Electroencephalography |
| ESG | Environmental, Social and Governance |
| F&O | Futures and Options |
| fMRI | Functional Magnetic Resonance Imaging |
| IRT | Item Response Theory |
| NCFE | National Centre for Financial Education |
| RBI | Reserve Bank of India |
| SEBI | Securities and Exchange Board of India |

## Author Contributions

**Prateek Sheth Dawesar:** Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing

**Anuradha Sharma:** Supervision, Validation, Writing – review & editing

## Conflicts of Interest

The authors declare no conflicts of interest.

## References

[1] Barber BM, Odean T. Trading is hazardous to your wealth: The common stock investment performance of individual investors. Journal of Finance. 2000; 55(2): 773–806. https://doi.org/10.1111/0022-1082.00226

[2] Barberis N, Thaler R. A survey of behavioral finance. In: Constantinides GM, Harris M, Stulz RM, editors. Handbook of the Economics of Finance. Vol. 1. Amsterdam: Elsevier; 2003. p. 1053–1128. https://doi.org/10.1016/S1574-0102(03)01027-6

[3] Bikhchandani S, Sharma S. Herd behavior in financial markets. IMF Staff Papers. 2001; 47(3): 279–310. https://doi.org/10.2307/3867650

[4] Hirshleifer D. Investor psychology and asset pricing. Journal of Finance. 2001; 56(4): 1533–1597. https://doi.org/10.1111/0022-1082.00379

[5] Kahneman D, Tversky A. Prospect theory: An analysis of decision under risk. Econometrica. 1979; 47(2): 263–291. https://doi.org/10.2307/1914185

[6] Loewenstein G. Emotions in economic theory and economic behavior. American Economic Review. 2000; 90(2): 426–432. https://doi.org/10.1257/aer.90.2.426

[7] Lusardi A, Mitchell OS. The economic importance of financial literacy: Theory and evidence. Journal of Economic Literature. 2014; 52(1): 5–44. https://doi.org/10.1257/jel.52.1.5

[8] Riedl A, Smeets P. Why do investors hold socially responsible mutual funds? Journal of Finance. 2017; 72(6): 2505–2550. https://doi.org/10.1111/jofi.12547

[9] Shefrin H, Statman M. The disposition to sell winners too early and ride losers too long: Theory and evidence. Journal of Finance. 1985; 40(3): 777–790. https://doi.org/10.1111/j.1540-6261.1985.tb05002.x

[10] Statman M. Finance for Normal People: How Investors and Markets Behave. Oxford: Oxford University Press; 2017.

[11] Thaler RH. Toward a positive theory of consumer choice. Journal of Economic Behavior and Organization. 1980; 1(1): 39–60. https://doi.org/10.1016/0167-2681(80)90051-7

[12] Tversky A, Kahneman D. Judgment under uncertainty: Heuristics and biases. Science. 1974; 185(4157): 1124–1131. https://doi.org/10.1126/science.185.4157.1124

[13] Snyder H. Literature review as a research methodology: An overview and guidelines. Journal of Business Research. 2019; 104: 333–339. https://doi.org/10.1016/j.jbusres.2019.07.039

[14] Paul J, Criado AR. The art of writing literature review: What do we know and what do we need to know? International Business Review. 2020; 29(4): 101717. https://doi.org/10.1016/j.ibusrev.2020.101717

[15] Putnick DL, Bornstein MH. Measurement invariance conventions and reporting: The state of the art and future directions for psychological research. Developmental Review. 2016; 41: 71–90. https://doi.org/10.1016/j.dr.2016.06.004

[16] Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. Organizational Research Methods. 2000; 3(1): 4–70. https://doi.org/10.1177/109442810031002

[17] Fernandes D, Lynch JG Jr, Netemeyer RG. Financial literacy, financial education, and downstream financial behaviors. Management Science. 2014; 60(8): 1861–1883. https://doi.org/10.1287/mnsc.2013.1849

[18] Kräussl R, Oladiran T, Stefanova D. A review on ESG investing: Investors' expectations, beliefs and perceptions. Journal of Economic Surveys. 2023; 37(4): 1100–1130. https://doi.org/10.1111/joes.12599

[19] Pastor L, Stambaugh RF, Taylor LA. Sustainable investing in equilibrium. Journal of Financial Economics. 2021; 142(2): 550–571. https://doi.org/10.1016/j.jfineco.2020.12.011

[20] International Organization of Securities Commissions. Digital Engagement Practices (DEPs): Report. Madrid: IOSCO; 2025. Available from: https://www.iosco.org/library/pubdocs/pdf/IOSCOPD794.pdf

[21] Securities and Exchange Board of India. Updated SEBI study reveals 93% of individual traders incurred losses in equity F&O between FY22 and FY24; aggregate losses exceed ₹1.8 lakh crores over three years. Mumbai: SEBI; 2024 Sep 23. Available from: https://l1nq.com/bmz6p05

[22] Reserve Bank of India. Annual Report 2022–23. Mumbai: Reserve Bank of India; 2023. Available from: https://m.rbi.org.in/Scripts/AnnualReportPublications.aspx?Id=1404

[23] National Centre for Financial Education. All India Financial Literacy Survey: Final Report. Mumbai: NCFE; 2023. Available from: https://ncfe.org.in/wp-content/uploads/2023/12/NISM_Final-Report-All-India.pdf

[24] OECD. OECD/INFE 2020 International Survey of Adult Financial Literacy. Paris: OECD Publishing; 2020. https://doi.org/10.1787/145f5607-en

[25] Ocansey, E. O., & Manu, V. (2025). The relationship between financial literacy and financial behavior: A systematic literature review. *Journal of Economics, Finance and Accounting Studies*, *7*(4), 101-116.

## Biography



**Prateek Sheth Dawesar** is a PhD scholar at the School of Psychology at Shoolini University, specializing in behavioural finance and cognitive biases in trading behavior. His research explores the relationship between cognitive biases, re-trading tendencies, proitability, and psychological well-being. With an M.Phil. from Himachal Pradesh University, he has conducted research on burnout among doctors during COVID-19. He has clinical and counselling experience through working as a school psychologist, and currently serves as a Teaching Associate, contributing to academic instruction, student mentorship, and research development.



**Anuradha Sharma** is a Professor and Head of School of Psychology with over 26 years of experience in teaching, research, and academic leadership. Specializing in clinical and counselling psychology, she has contributed extensively to mental health research, authored publications, and led academic programs. She is actively involved in curriculum development, student mentorship, and organizing conferences and workshops to promote psychological education and holistic development.